HORSELESS AGE — The oldest automotive paper published in the English language has been purchased by The Class Journal Co. Its engineering features, and a part of its circulation, have been merged with — AUTOMOTIVE INDUSTRIES

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The AUTOMOBILE

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No. 6

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The Crisis Proves The Car

In the Very Face of Curtailment Hudson Dealers Find Reason for Self-Congratulation

Hudson dealers are feeling the curtailment in production keenly.

They're asking for more Super-Sixes every day than can possibly be delivered in a month.

It is costing them money not to get them.

And yet they're not whining.

They seem disposed to accept conditions much in the spirit of the French —shrug their shoulders and make the best of it—"C'est la guerre".

In fact, we believe there is not a Hudson dealer who is not congratulating himself more than before.

Why?

Because this crisis is proving again —more emphatically than ever—the caliber of the car he handles.

It almost seems as if Hudson engineers built three years ago with the present crisis in mind.

The power and endurance they put into the Super-Six then and have refined and improved since is proving the Hudson essentially a war-time car.

Hudson quality is the quality that endures.

With the need for automobile transportation greater and the requirements more severe, Hudson Super-Sixes are "seeing their owners through".

Little wonder that it stimulates a man's pride to handle a car like the Super-Six.

These are the reasons why, in the face of curtailment, Hudson dealers find good reason for self-congratulation.

Hudson Motor Car Company — HUDSON SUPER SIX — Detroit, Michigan

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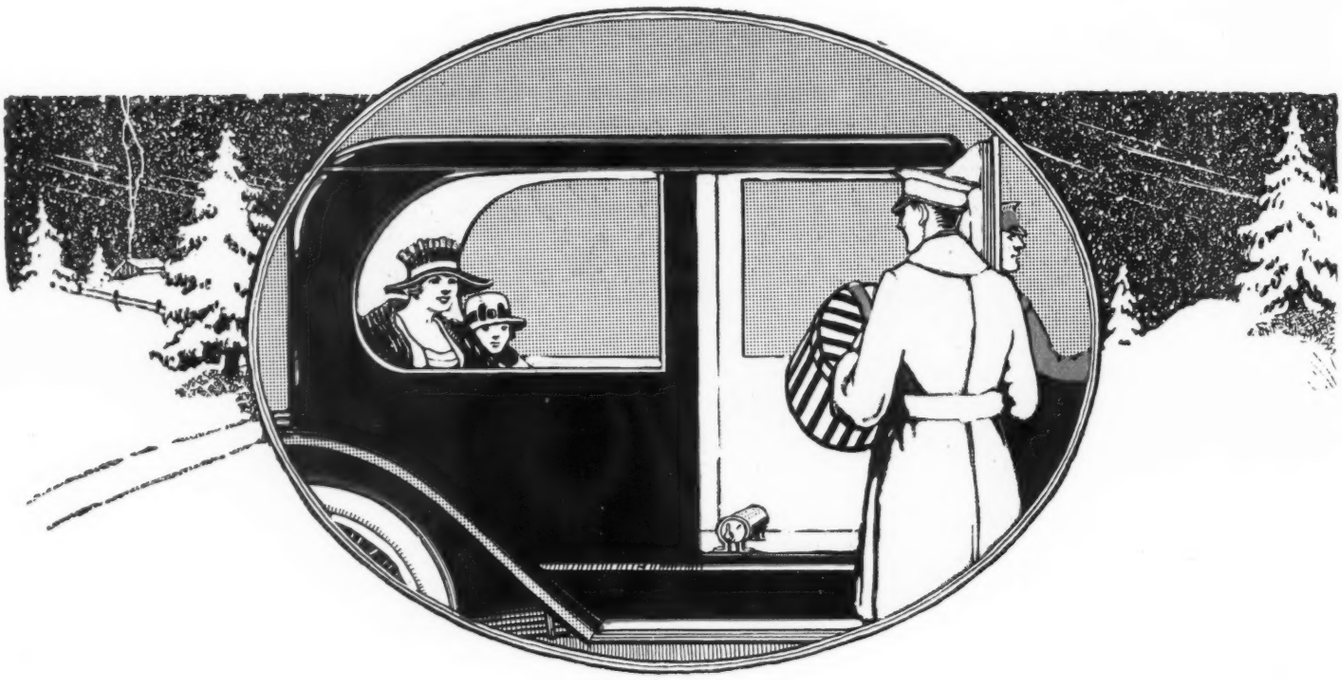


UTILITY
Protected Foot Rail
HEATER

WHY NOT PREPARE FOR WINTER TRADE NOW?

Cold weather will soon be here, with a greatly increased demand for Utility Heaters. Our live dealers are ordering now, as there is already a well-established demand for Utility Heaters. It is to the advantage of every dealer and jobber to see that he can supply the trade. Better not wait—send in your initial order **now.**

The Utility Heater is the accepted standard of motor car heating. Its principle is sound, logical and convincing. It insures perfect driving comfort, even in the coldest weather, by tempering the atmosphere of the car to any desired degree. It keeps you warm all over, as though you were in a carefully heated house.

UTILITY Protected Heater—installed in place of the foot rail—is the heater universally recommended by thousands of motorists during the past season—the heater jobbers catalog and the heater manufacturers you will know install as standard equipment.

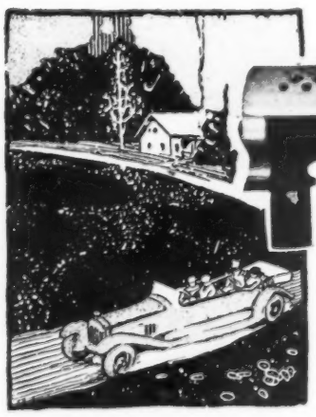
Ease of installation, attractive appearance, freedom from dust, odor or trouble make it the highly desirable heater.

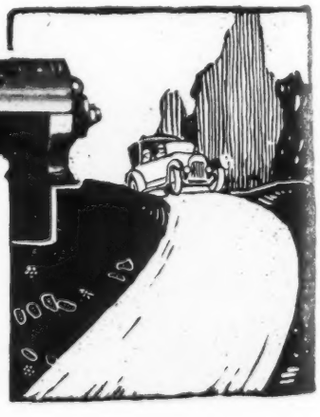
DEALERS—Ask your jobber or write to us for details

THE HILL PUMP VALVE CO.

Archer Avenue and Canal Street **Chicago, Ill.**

Manufacturers of Famous UTILITY Auto Specialties





PRICES

Utility Protected Heater	$20.00
Utility Front Seat Heater	12.50
Utility Jr. Heater for Fords	9.00
Utility DeLuxe Heater for six and eight cylinder cars	25.00

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XXXIX NEW YORK—THURSDAY, AUGUST 8, 1918—CHICAGO No. 6

Provision of Adequate Housing Facilities Big Tractor Problem

Makers Must Insist on Farmers Taking Care of Their Machines as a Conservation Measure—Need for Standardized Parts More Apparent—Air Cleaners Are Important

By David Beecroft

KANSAS CITY, August 5—A major problem confronting the farm tractor industry is that of adequately housing the tractor on the farm and not leaving it all winter in the corner of the field where it finished the last job. The Kansas farmer—this may also apply to the farmers of many other states—is notorious for his carelessness with farm machinery.

Yesterday we drove from Salina, where the National tractor demonstrations were held, to this city through one of the finest winter wheat-growing areas, and it was almost agonizing to see the wrecks of farm machinery strewn around nearly every farmyard. One could not fail to feel how inconsistent we are as a people in permitting this enormous annual waste of metal in these days of steel conservation when we are restricting the uses of steel in many useful and essential industries.

The average farmer is a poor hand at caring for his machinery. Perhaps this is due to the fact that the machinery makers have not been continuously insistent enough that he do this. We are led to this conclusion by the fact that you will find on the same farm that we saw yesterday a good, modern, up-to-date garage that will accommodate two motor cars, and in the farmyard surrounding this garage you will see standing out, exposed to the weather, such farm machinery as binders, corn harvesters, mowing machines, plows, harrows, disks, and in some instances tractors.

The fact that the farmer has built not only a single garage but a double one is evidence that he is susceptible to advice as to the care of his farm equipment. His car is as clean-looking as those kept in the average western town or city. Undoubtedly the automobile manufacturer and the automobile dealer have been largely responsible for this. They have taught the farmer his first lesson in caring for machinery.

There is a strong hope that through this same channel the farmer will be taught to give better care to his tractor and his farm machinery as well, because this same automobile dealer who sold him his automobile is now selling him his tractor, his threshing machine, his plows, his disks, his seeders and his other tillage instruments. Many of these dealers are to-day automotive dealers in every sense of the term.

If tractor manufacturers will constantly urge through their dealers the propaganda of caring for farm machinery, it will not be long before the disgraceful sight of farmyards strewn with weather destroyed farm machinery will be corrected to quite an extent. The destruction of farm machinery by this cause is of such proportion that the local Councils of National Defense should take it up and institute a general movement for the conservation of these machines, thereby conserving our supply of steel and also conserving labor.

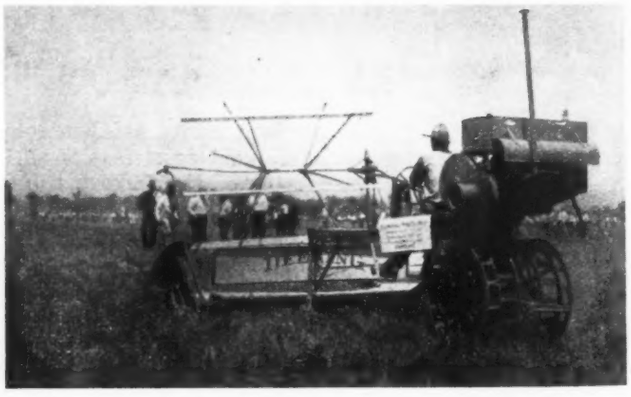
It is not unusual to see as many as three binders standing in the corner of a large wheat field, perhaps in the shade of a few trees. Some of them have the canvas for elevating the grain removed and others have not. Where the canvas is not removed $70 or $80 will be required next year to put in new canvas to take the place of that rotted during the winter. This canvas is made from

Views at the Salina Tractor Demonstration

Where the Various Types of Tractors and Farm Implements Were Put Through Their Paces

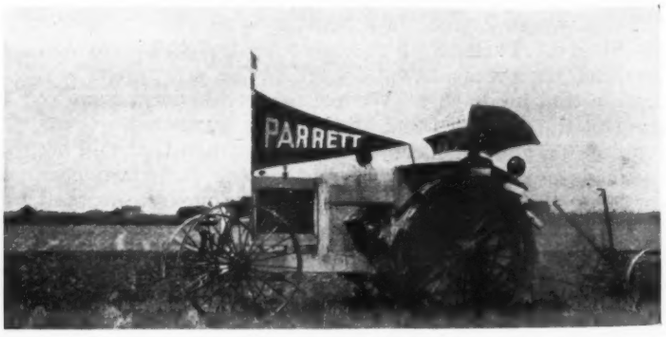
General view of plowing scene at the Salina tractor demonstrations

This tractor has stood outside for a year; so has the plow attached to it. It is a bad advertisement for the tractor as well as the farm

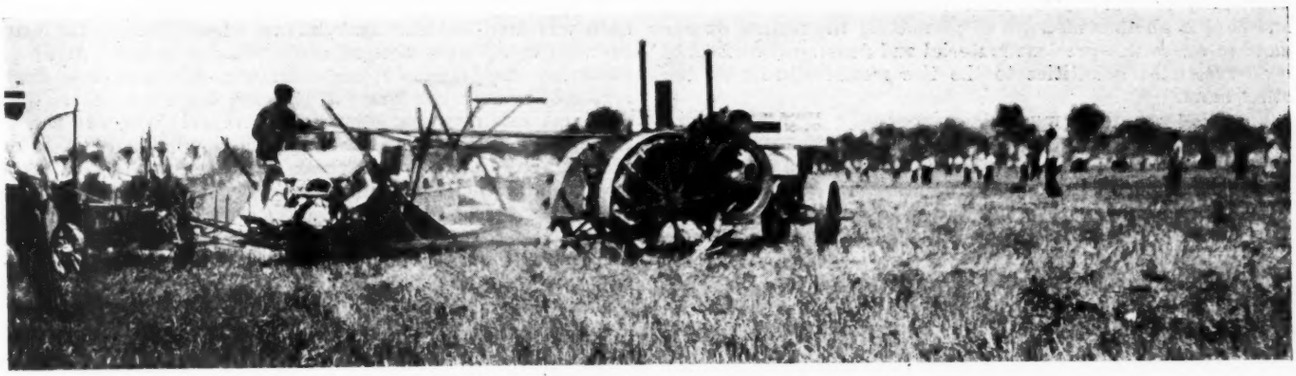


The International Harvester Co. demonstrated its two-wheel tractor unit pushing a binder, so that one man could operate the tractor and binder

The Fordsom tractor disking on newly plowed soil at the Salina demonstration

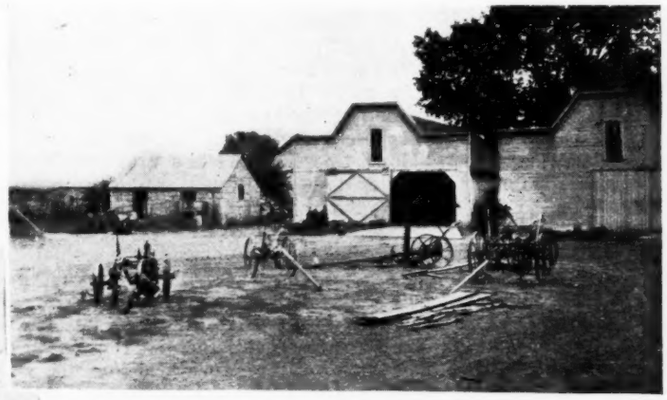


The Model H Parrett 12-25 tractor which made a 103-hr. test and plowed night and day for 80 hr.



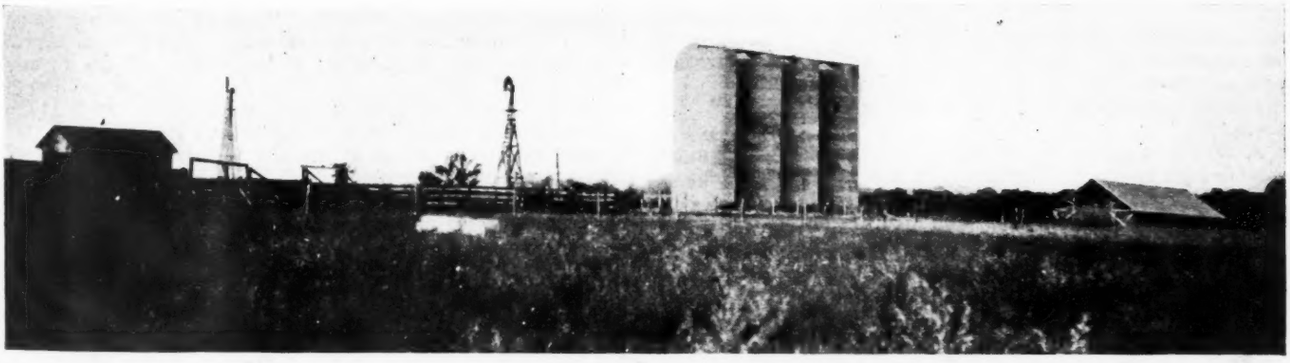
The wrong way to do it—here the operator sits on the binderand controls the tractor by extension controls. He should sit on the tractor and have the binder controls brought close

Right—This is a typical farm yard in Kansas showing how machinery is left outside to rot and rust. On this farm is a good double garage for the automobile and buggy



Above—Double garage on a farm near Salina, Kansas. If the farmer will build a garage for his automobile he can also be induced to build a house for his tractor

Right—Corner of a large Kansas farm showing machinery overgrown with weeds. This farm has a good garage, sleeping porches and electric lighting



On hundreds of farms in Kansas you see these cement silos for corn. Generally there are one or two cylindes, but this one has four. Yet on this farm the machinery is not housed

practically the same material as is used in automobile tires, and here is another instance of permitting the farmer on one hand to waste this precious material and denying it or issuing it in restricted quantities to the tire manufacturers on the other hand.

Complete revolution must take place in the farm machinery field so far as the care of it is concerned. The automotive manufacturer must take a hand in this work and there is no time more opportune than the present.

The redesigning of farm machinery so that it can be operated by one man, preferably the one who rides on the tractor, has not made as good progress during the year as it should have. This work is one of the important ones facing the tractor manufacturer and also the manufacturer of farm machinery. There is no help on the farms to-day for two-man machines—that is, one man driving the tractor and the other seated on the binder or another piece of farm machinery.

Implements Must Be Redesigned

It is necessary to turn the farm machinery almost directly around; heretofore the farmer has ridden on the back of the machinery and the levers for controlling it have been placed to be convenient for him in that position. With the tractor hitched ahead of the machine, it is necessary to rearrange these levers and bring them up to the front so that they can be operated by the man riding on the tractor.

Farm machinery manufacturers were urged last fall to redesign their machinery along this line and the progress is rather disappointing. One or two manufacturers have revamped some of their binders but the work has scarcely been started.

A few machinery makers think that the operator can ride on the binder, for example, and control the tractor through an extension of the steering gear and with some system of ropes for regulating the engine speed and the clutch. This latter scheme is not generally looked upon as satisfactory, the general conclusion being that the operator should ride on the tractor and the farm machinery should be modified to make its operation quite easy from the tractor.

The necessity for a greater supply of standardized parts for use in the tractor, which was mentioned last week, has been further impressed as the demonstrations have progressed. There is urgent demand for a good design of steering gear which can be fitted on many makes of tractors. Such a steering gear should be quite inclosed with adjustable parts, the same as on a motor truck or motor car. Two or three firms have already intimated that they are developing such a type but none which seems to measure up with all of the requirements has as yet come on the market.

The extent to which a steering gear, which is not properly protected, wears out was evidenced at the Salina demonstrations, by a farmer who operates a tractor with an exposed type of steering gear. It has been necessary to replace the steering gear twice each year since he installed the machine. The cost of two new steering gears per year is a factor in itself, but another factor not to be overlooked is the time required in making the replacement and the added cost if this is to be done by a mechanic from a garage or tractor service depot.

Need More Standardized Parts

The necessity for further standardization of tractor parts was apparent many times during the Salina demonstration and was frequently commented upon by engineers who are designing tractors, and by others who are making parts for tractors.

A case in question is that of the bell housing for engines intended for tractors. The bolt holes are too near the edge of the housing to give the necessary strength where the engine housing and the gearbox housing form a continuous bridge construction, making it possible to lift off the frame side members as every tractor maker is doing at present. Not only will the flanges on the bell housing have to be increased in size, but larger diameter bolts will have to be used to take the extra strain in this type of tractor construction. Now is the time to get this standardization work lined up, rather than allowing different engine makers to bring out their individual width and diameter of flanges and to use their own diameter bolts.

A possible market for some standardized design of front axle was well evidenced at Salina where there were over twenty-five different designs of front axles in use. Many of these are the built-up types of axles made from bar stock arranged in different forms of bracing; there are others that are steel castings, and others that are forgings. It was a favorable comment on standardization to find not a few of those tractors that had different front axles using the same engine, the reason being they were able to buy a satisfactory type of engine but were apparently not able to buy a standardized design of axle that met their requirements. Had there been standardized axle designs, the same as standardized engine types, unquestionably these would have been used and a good deal of cost and labor conserved thereby.

If the Salina demonstrations accomplished nothing further than to prove it is possible to plow as well at high speeds as at low, this in itself was well worth while. In a 2-hr. plowing test, some of the smaller machines averaged 3.5 m.p.h. A year ago too many tractor manufacturers declared that it was impossible to plow at such a speed. The redesigning of mould boards on plows during the past year has demonstrated that you can plow as well as 3.5 m.p.h. as you can at 1.5 m.p.h. Plowing speed depends entirely on the shape of the mould boards of the plow. This redesigning of farm machinery thus putting it on a tractor pace as compared with horse pace is one of the hopeful tractor developments of the past year.

Air Cleaners Are Important

The question of air cleaners is still a mooted one in tractor design. While the centrifugal type of air cleaner still leads in the number of equipments, there is more attention being given to the water cleaner than there was a year ago. As yet, sufficient reliable data have not been compiled on the relative merits of the different types of cleaners to establish the future of any one type, and undoubtedly the salability of the different concerns will for some time be a determining factor as to which type of cleaner is used.

The air cleaner has the advantage of light weight and relatively compact shape. On the other hand, several of the water cleaners are rather large. They call for frequent replenishing of the water supply.

For the average farmer, it is a problem as to whether he can give the necessary attention to the water cleaner or not, especially because he is even neglectful of lubrication of the engine and many of the engine troubles are due to his failure to change the lubricating oil as frequently as he should, and to his failure to give the engine sufficient oil.

The water type of cleaner has already given indication that quite a percentage of the water passes in through the cylinders and where kerosene is being used as a fuel, this water does its part in reducing the temperature and preventing preignition. Some tractor makers have mentioned that in tests they have noticed the disposition of the engine to heat up and lose power when the water in the cleaner is exhausted and after a replacement of water the engine has renewed functioning without any indication of heat.

Dealer Must Handle Service

The question of tractor service is one which the tractor manufacturer must pass on to the dealer. The time is past when the tractor manufacturer, if he is an old line implement man, can handle the service business by a corps of service experts traveling the country at the request of the farmer. These manufacturers are admitting this. They state unqualifiedly that the dealer must give the service and that in giving this service he must give it promptly and charge for it. By prompt service is meant giving the farmer spare parts and doing repair work for him within a few hours from the time the farmer telephones for such parts.

Tractor service must be taken to the tractor on the farm, as the tractor cannot be brought from the farm to the garage or the repairshop of the dealer. There is not a single tractor manufacturer who has a quantity of machines in use but who admits that the old service methods that have served for the binder and other farm machinery are inadequate for the tractor. There is not a tractor maker big enough to cover the country with the necessary number of service men to give adequate service on the machines in use.

This brings tractor manufacturers face to face with the

new problem of discounts to dealers and distributers. These manufacturers who have been giving a 15 per cent discount to dealers based on a service practice in the past will find it inadequate for the future. Some of the best dealers admit that it requires approximately 15 per cent to do business on, and that they cannot give necessary service on this discount.

The aggressive practical tractor dealer has already his service car or truck with which his mechanic makes trips of 10, 15 and as high as 30 miles in the country to repair tractors and farm machines. Up to the present the farmer has not been given a very strict schooling on paying for service for his farm machinery. Most of the machinery houses admit that they have handled the different cases as they thought best. In some cases they have charged for service and in other cases they have not.

In this respect, the old line implement dealer has not been a strong enthusiast on service. He has not been prepared to give any kind of service, but has passed the business along to the branch houses of the implement company. The implement dealer of this type has generally sided with the farmer, not only on the question of service, but also on the question of time payments on machinery.

The tractor manufacturer must recognize that his dealers have this handicap to overcome. They have to introduce the tractor. They have to educate the farmer in its use. They have to make many repairs and replacements for the farmer. Lastly, they have to perform many little service jobs which the farmer should be able to do himself. Tractor manufacturers must take recognition of this, and not forget that a healthy dealer means a healthy business. Unless the dealer is making money, he cannot be a good representative of the manufacturer.

The automotive dealer of to-day, on the other hand, is going to have an opportunity of making a little extra money out of the sale of farm machinery, which will partly recompense him for the cost of tractor service. When a dealer sells a tractor he generally sells the plow that goes with it. Some dealers are stocking these plows, but where the factory has a branch house in the territory it is scarcely necessary to do this.

There are dealers who are selling threshing machines, disk harrows and all other lines of farm machinery, and the day has arrived when the automotive dealer is going to sell a large percentage of the farm machinery that goes with the tractor.

Tractor manufacturers should, in practically all contracts with dealers, insist on the dealer arranging to carry a small stock of spares. This is necessary for the good will of the tractor. It will greatly reduce sales resistance. The farmer is going to act a little differently in the purchase of the tractor as compared with the purchase of a motor car which may not be such a business proposition.

He was not averse to going 30 miles to purchase his new motor car, but is insisting on buying the tractor nearer home. As a result, there are springing up through the grain belt automotive dealers who are located in towns of 1000 population and are selling more tractors than dealers in places of ten times the population.

The farmer wants to buy his tractor as near home as possible. He knows that the dealer is then only a half hour from him instead of a half day or perhaps a day. The tractor to be a success must be kept working all the time, and the makers must co-operate with the dealer and assist him in carrying this load.

There is no necessity for a manufacturer or dealer giving free service. The farmer will pay for legitimate work done. But he insists on having this work done as quickly as possible. Having a tractor used for threshing laid up for a half day or one day is a serious loss as compared with a motor car or even a motor truck incapacitated for the same period.

Tractor manufacturers must work more closely with their dealers on this service problem than they have heretofore. They should offer their dealers special discounts where they carry stocks of parts above a certain value. They should offer special discounts where the dealer is prepared to give service by the way of service wagons and expert help specially for the farm use.

In this connection one of the makers of the farm lighting equipment has set up a good standard by insisting that all dealers have one man who gives all of his time to the sale of this article and that there be provision for moving a demonstrating unit through the territory. While this is selling service, it suggests how necessary it is to put tractor service on as high a standard.

100-Hour Plowing Test of Kerosene Tractor

SALINA, KAN., Aug. 3.—The Parrett model H tractor which started on July 26 to make a 100-hour non-engine-stop plowing demonstration on one of the large winter wheat farms four miles from this city completed its official test, which was conducted by J. B. Davidson of the University of California.

The engine was run on kerosene for 103 hr. and 19 min., during which period there were two stops totaling 5 min. and 40 sec., both of which were due to sediment collecting on the bowl in the fuel line between the kerosene tank and the carbureter. Outside of these two enforced engine stops the engine was running all of the time.

It was necessary to stop plowing for 13 hr. and 28 min. due to rain, during which time the engine was kept running at 360 r.p.m., which was a good idling demonstration with kerosene.

Throughout the demonstration accurate record was kept of kerosene, lubricating oil and water, as well as the depth of plowing. The tractor plowed for a total period of 80 hr., 42 min. and 20 sec., although this was not a continuous performance, there being several stops to take on fuel and make repairs. It was necessary to replace a defective bearing in the left front wheel requiring 1 hr. 28 min., most of which time was needed for getting the bearing.

Throughout its plowing period the Parrett averaged 2.4 m.p.h. while pulling its three 14-in. Oliver plows. This is quite a remarkable speed and demonstrated the argument that the tractor can work as efficiently at high speeds as at low. Traveling at this speed it averaged .95 acre per hour.

Kerosene was used as fuel from start to finish. The average consumption was 1.99 gal. per hr. The official report gives the consumption on an hour-acre basis and places it at 2.008 gal. per hour-acre. The term hour-acre is similar to ton-mile in motor truck transportation, and has been used as the unit of measurement.

The consumption of lubricating oil approximated 1 gal. to every 12 acres plowed. During the 103 hr. and 19 min. the engine was running 6.5 gal. of oil was used. On a per-hour-acre basis this is .084 gal.

The Parrett tractor in this test used a water air cleaner and 7.5 gal. of water were used in this cleaner. The test unofficially demonstrated that a goodly portion of this water enters the cylinders and serves to keep the temperature of the kerosene mixture down. No other provisions were made for injecting water into the mixture.

During the 103 hr. and 19 min. 24.2 gal. of cooling water were used in the radiator, which approximates .314 gal, per hour-acre.

During the official test the depth at which plowing was done was measured 247 different times, and the average depth was 6.36 in., which is equal to that required by all scientific farmers who depend on winter wheat in the Kansas belt.

It was demonstrated during the test that night plowing can be done as efficiently as that done by daylight. The tractor was equipped with two Prest-O-Lite lamps which provided ample illumination.

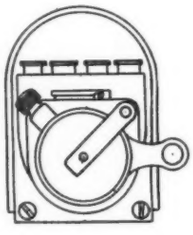
Non-Distributor and Multipolar Magnetos

A Discussion of the Practical Possibilities of Magnetos Designed for Use with Separate Distributors on the Engine Camshaft—Multipolar Magnetos Delivering Up to Six Sparks Per Revolution

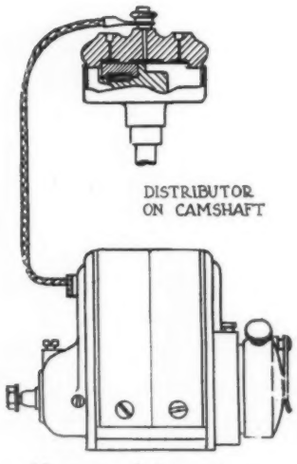
By Fred I. Hoffman

WITH the exception of magnetos used for the ignition of gasoline engines with one or two cylinders, the magneto-electric machine for ignition purposes has been developed on lines that cannot be considered absolutely ideal. The inability of the manufacturers to design igniters to give any number of sparks per complete revolution has introduced most peculiar constructions and has not simplified or improved matters to the same extent as in other departments of automobile engineering. Attempts, no doubt, have been made, but the problem is not easy to solve satisfactorily, and great difficulties must be surmounted before any advantageous result can be obtained. Lack of reliable and authentic research data and the fixed idea that the wound H shuttle armature is the best have been responsible for the stagnation. Another reason (also very important) is the manufacturer's lack of knowledge of what is being done in other automobile producing countries.

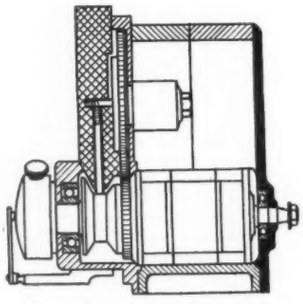
The success of the Bosch Company, the well-known German firm, and its high reputation, are solely due to the supply of a very well made and accurate article from the beginning, when mechano-electrical ignition machinery was in its infancy. A world-wide monopoly was thus created which left the impression upon the manufacturer and the public alike that generators working in a 2-pole field with the wound H armature were the acme of perfection and would remain so for some time to come. The stagnation in design on other lines but those embodying the original Bosch construction can clearly be traced and can be attributed to this German



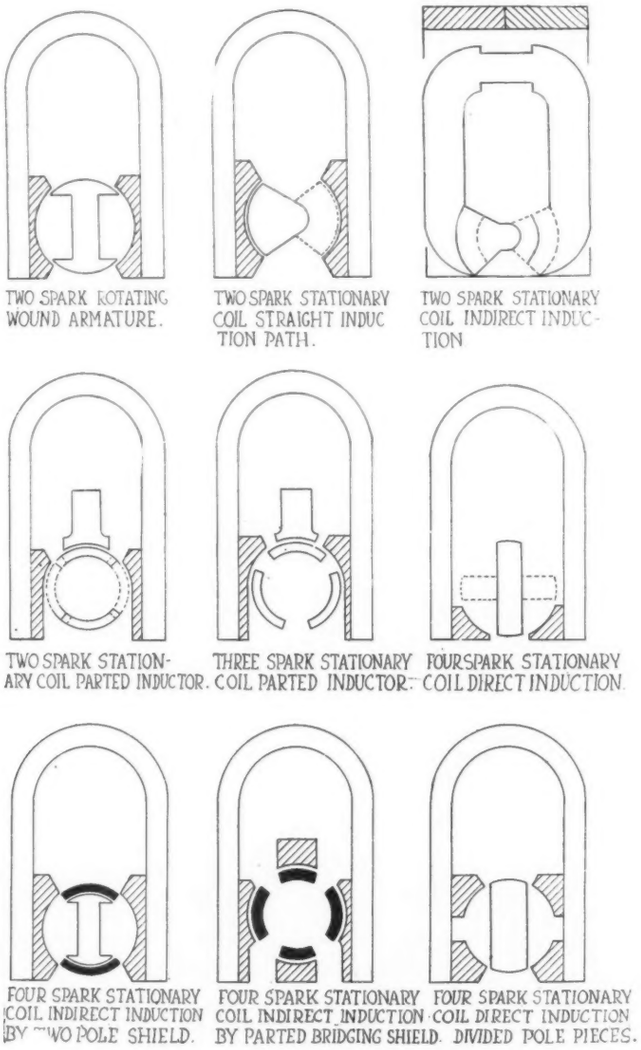
Gearless magneto driven at camshaft speed and without separate distributor



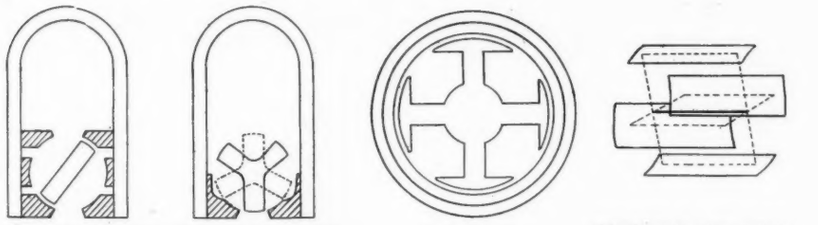
Magneto driven at engine speed and having separate distributor on camshaft



Location of brushes leading to the distributor


TWO SPARK ROTATING WOUND ARMATURE.
TWO SPARK STATIONARY COIL STRAIGHT INDUCTION PATH.
TWO SPARK STATIONARY COIL INDIRECT INDUCTION
TWO SPARK STATIONARY COIL PARTED INDUCTOR.
THREE SPARK STATIONARY COIL PARTED INDUCTOR.
FOUR SPARK STATIONARY COIL DIRECT INDUCTION.
FOUR SPARK STATIONARY COIL INDIRECT INDUCTION BY TWO POLE SHIELD.
FOUR SPARK STATIONARY COIL INDIRECT INDUCTION BY PARTED BRIDGING SHIELD.
FOUR SPARK STATIONARY COIL DIRECT INDUCTION DIVIDED POLE PIECES.

Various types of magneto construction


SIX SPARK ROTATING WOUND ARMATURE DIVIDED POLES
SIX SPARK STATIONARY COIL DIRECT UNCTION
FOUR SPARK FOUR POLE WOUND ARMATURE
ARMATURE OF FOUR SPARK MAGNETO. THICK LINE DENOTES CORE OF SINGLE COIL.

Principal types of magneto armatures, showing shape of pole pieces and their relation to the armature itself

form. It is quite evident that workers in this field with limited knowledge and capital would prefer to copy an existing successful article than to start experimenting with new ideas and thereby leave the trade in the possession of the firms first in the field. However, this alone is not the only reason. The reluctance of the engine builder to test and fit generators not of orthodox design and embodying features other than those of accepted practice is really the main cause. When so many improvements tending toward greater simplicity are being brought out, it is very strange to note the number of makers producing standard magnetos for multi-cylinder engines. Of course, the present day machine unit can be replaced in a few minutes by a new one and will fit in the place of any other make, but this is not the main advantage to consider. A professional man will find the replacing and retaining of any magneto a very simple procedure, but not so an inexperienced amateur driver, and considering the number of the latter drivers of vehicles we have to side with the civilian, so to say.

To simplify the ignition distribution, we have only to employ a multi-cylinder machine giving any number of sparks per revolution to suit the cylinders, or employ an ordinary magneto as used for single cylinder engines, but fitted with a double cam, and a high-tension distributor coupled to or driven off the camshaft gearing somewhere on the engine. The former arrangement is the ideal one, but the latter certainly is an advancement on the running practice.

A distributor arranged somewhere on the front, side or back, and fitted in a very accessible position, getting the current which is to be distributed from the magneto terminal by a single wire, will surely be looked upon with more favor than the self-contained apparatus. Another advantage of employing a distributor fitted on the engine proper lies in the *wiring* to the spark plugs, which in this form has *not to be disturbed when changing* the generator. The relative cost of a gearless magneto—even if we consider that an additional special distributor be employed—as compared with a machine with self-contained arrangement is certainly one-half. What plausible reason is there to burden a magneto with a set of gearing when a similar reduction transmission already is provided on all engines for working the valves and could be made use of? A magneto driven at a certain speed and giving the requisite number of sparks is all that is required. By utilizing such a firing system we get the following advantages as well: One standard magneto for engines with different number of cylinders; a standardized distributor, standard terminals, brushes, etc. The magneto would have smaller overall dimensions, would be lighter, more compact and neater in appearance; it would have less parts to wear and could be fitted and adapted in an easier way. It may be urged by the manufacturer of multi-cylinder magnetos that the generator with a distributing device fitted at a distance from its supply source requires an extra brush, which is liable to give trouble, but this is certainly not the case. With the exception of a single magneto (a French make) there are no magnetos on the market using a wound H armature and doing away with the second primary brush, viz., the one on the other end from the slipring terminal connection.

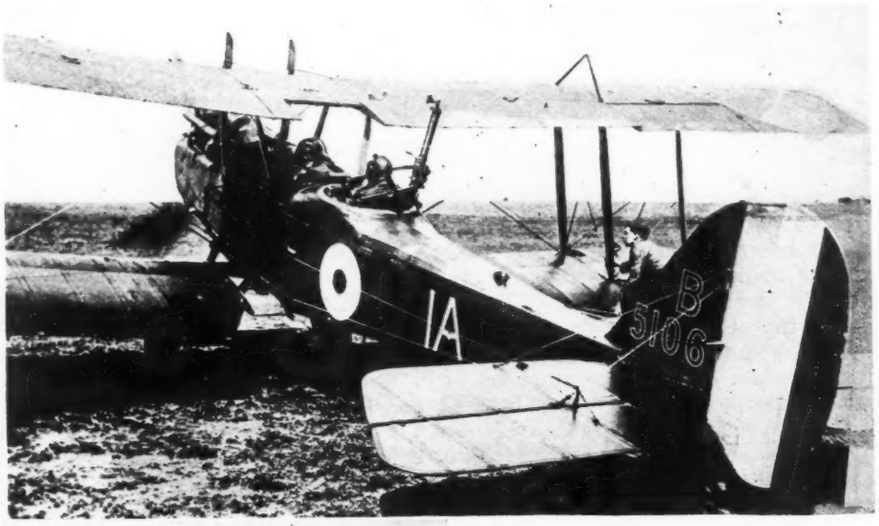
The types of magnetos at present employed can be subdivided into those using a rotating armature with an H core and an induction coil, those having a stationary coil and a solid unwound rotating inductor sending the flux direct through the coil center and those that have a stationary coil winding which is being indirectly excited by a communicating or bridging agent revolving between field and core.

The number of periodic inductions per complete revolution of inductor, mainly depends either on the rotor or field design or the two combined (in some designs there are special combinations) and little on the relative position of the transformer unit. There are certain individual advantages in each one of the above mentioned constructions. The wound H, or Siemens' armature, is favored by a great many manufacturers, as this construction lends itself to a more robust design, the coil being direct and closely wound on the laminated core and fitted with condenser. The stationary coil magneto, on the other hand, employing an unwound simple rotor, either in shield rod or disc form, is cheaper to build, more easily repaired (for it consists of fewer parts) and is more durable. The rotating part being without any wiring whatever, is not subjected to the same centrifugal stresses as if wound. The disadvantages of this type are the somewhat longer path for the flux and the double airgaps, reducing the induction factor.

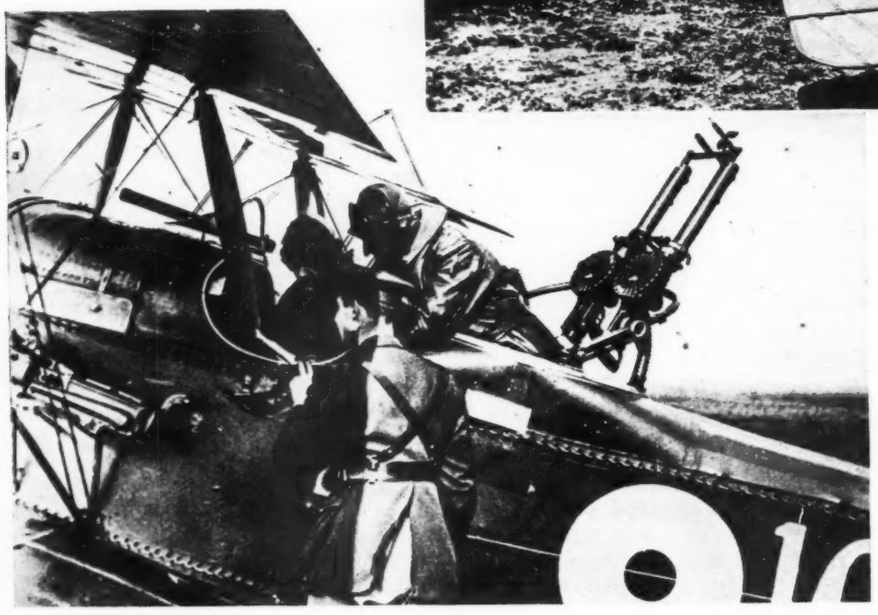
The number of sparks of the ordinary H pattern magneto in a two pole field, as shown in the sketch, is two per revolution; the same applies to the design of the pattern with stationary coil and employing a two-ended inductor, bridging disc or core rotor. To obtain three sparks with a two-pole field the simplest form is the one with the coil between the magnet limbs and a star pattern rotor. Magnetos of the two-pole field type, giving four sparks per revolution and using a stationary winding, are those with a rotary divided shield or opposed pronged pattern rotor and a longitudinally or concentrically situated transformer. In one design the bobbin is mounted on the outside. Four interruptions can also be obtained by dividing the pole pieces symmetrically, thus making four poles and having the stationary coil in between the limbs or wound on the rotary armature. With a wound coil and a three-parted pole piece we can also get six sparks per revolution.

There remains now only one other principle for our consideration, and that is the multiple armature design. Although the four-pole magneto has not given really satisfactory results, it may be just as well to illustrate the two constructions for comparison with the others. It will be noticed that the one pattern employs a single coil, the other four individual ones, and both embody the rotary Siemens idea.

With the British Airplane Forces



Type of British observation plane which is used for spotting enemy gun positions and directing the Allied artillery. This machine is about to ascend



This view shows very clearly the twin type of machine gun which now is coming into more extensive use among the Allied forces. The pilot has just landed and is turning over his reports of enemy gun positions

The Royal Flying Corps does not discard anything where there is the barest possibility of salvage work. This view shows two machines which will be reconstructed, using parts of other machines which have been damaged through accident or by enemy gunfire

British Official Photos

Sopwith Dolphin with Hispano Engine

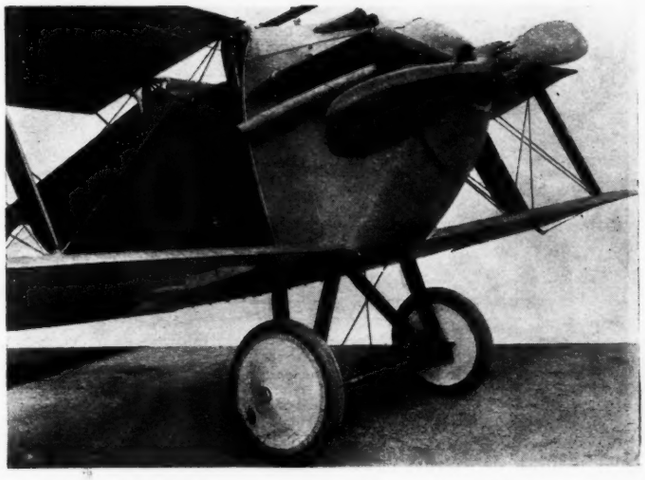
Front view of the Sopwith

WE show herewith three views of the present principal British scouting machine, the Sopwith Dolphin. It is equipped with an eight cylinder high compression Hispano-Suiza Vee engine of 200 hp. At an altitude of 15,000 feet it is capable of developing a speed of 115 m.p.h. and its climb is 10,000 ft. in 8.3 min.

The armament consists of four machine guns. Of these two are Lewis guns mounted on a bar above the pilot's head, and two synchronized Vickers guns which fire through the propeller. One of the unusual features of this machine is the negative stagger of its planes, the top planes being set back from the lower planes. There are two pairs of struts on each side of the fuselage and the wing bracing is of the conventional type. Both the upper and lower wings are fitted with ailerons.

The upper wings do not run straight across but are set with a considerable space between them, where the pilot's seat is located. The forward end of the fuselage is covered with a cowl which gives about as good a streamline effect as is possible with a Vee engine.

There appear to be windows in the lower planes through which the pilot may observe the field below him. The radiator is mounted on the sides of the fuselage.



Forward part of the Sopwith Dolphin

Side view of Sopwith Dolphin, showing negative stagger of planes

Organization of the German Army Aviation Service

Four Classes of Squadrons for Bombing and Reconnaissance, Artillery Work, Fighting and Photographing—Traveling Circuses Named for Their Leaders

ACCORDING to Major H. O. D. Segraves of the Royal Flying Force, who was interviewed in Washington a day or two ago by a representative of AUTOMOTIVE INDUSTRIES, the German reconnaissance or photographic aviator never makes an attempt to secure his information or to make photographs when trouble in the form of a hostile aviator appears on the horizon. Instead, he stops his work and implicitly obeys instructions from headquarters, getting away as fast as possible.

The German aviation service on the Western front is commanded by Col. von Tomsen, who is stationed at German general headquarters at Charleville. Col. von Tomsen is under General von Höppner, who is in charge of the aviation service of all the German armies and is located in Berlin. The "flugchef," Major Wildt, who is in direct charge of a series of staff officers, assigns one to each aviation unit of the army.

"The German squadrons," said Major Segraves, "receive their orders from and are solely responsible to the staff officers.

"The squadrons are divided into four classes: Bombing and reconnaissance, artillery, fighting, and photographic. The first two are carried out only when specially ordered. From time to time a long distance

This photograph of the Somme battlefield shows the immense value of the "eyes of the air," the photographing airplane. Without this complete and accurate picture of the enemy's lines, an army would be well nigh helpless —with it, it is prepared, knows the exact artillery range and meets the enemy promptly

What was left of Bullecourt village in the Hindenburg line after the artillery of the British finished its work. The trenches are prominent

reconnaissance squadron is specially sent out to report on movements of trains, etc. The second, artillery work, is performed by squadrons especially equipped for this duty, and for this duty alone, each machine being fitted with wireless.

"Fighting is done by the special Jagdstaffeln, or 'traveling circuses,' as they are called, comprising 18 pilots all picked for their skill in fighting and fitted out with the latest and best types of machines that Germany can produce.

"These squadrons are not numbered or lettered, but are called by the name of the squadron commander, as 'von Richthofen's Squadron,' etc.

"The traveling circuses have no fixed airdrome, but tour up and down the lines, staying usually close to where the fighting is thickest, hence the name 'traveling circus.'

"In addition to the Jagdstaffeln, each artillery squadron has attached to it two or more scout machines which go up and protect the pilots on artillery observation. Their duty is not so much to attack as to defend in case of attack, when they engage the opponents until the observer is safely away. As a rule these scout pilots are not as efficient as the pilots of the traveling circuses.

"The Germans place far more individual value upon a machine than we do. When a squadron is moved to a different airdrome the pilots never fly their machines there. They always go by motor truck transport, and for this purpose practically every type of German machine is so made that it can be dismantled in about 15 minutes.

"The German machines vary considerably in type. The fighting scouts used principally are the Fokker triplane, the Pfalz and the Albatross VA. Baron von Richthofen, premier German aviator, was shot down while using a Fokker triplane. These machines have a speed of about 116 m.p.h. near the ground and a climb of 10,000 ft. in about 10 minutes. The engine is a 9 cylinder rotary Oberursel, a German copy of the French Gnome. The next machine, the Pfalz, is practically the same as the Albatross VA, which made its first appearance on the Somme in June, 1917. The performances of the two machines are very similar. Speed near the ground is about 108 m.p.h., with climb to 10,000 ft. in 11 or 12 minutes.

"The chief bombing machines include the

A photograph of German trench positions. An excellent example of the war territory, filled with trenches, shell holes and barbed wire. The photograph was taken at a height of 1000 ft.

A.E.G., a twin engine bomber with two 260 hp. Mercedes engines. They are used for short distance work behind the lines. Other bombing machines are the Gotha and the Friedrichshafen, the latter being of the Riesenflugzeug or giant airplane class. There is no actual machine named 'Riesenflugzeug,' as many people think. It merely denotes a certain class of machine of giant size, meaning literally 'the giant flying machine.'

"The Gotha and the Friedrichshafen types are used for all long range bombing work, such as the raiding of London. The engines are two 260 Mercedes or Maybachs.

"The speed of these machines ranges between 45 and 85 m.p.h. and the ceiling is about 15,000 ft., with full military load of bombs, guns, ammunition, etc.

"For artillery and photography work the Germans usually use the D.F.W, L.V.G., Albatross type D, Aviatik and the Hannover Fabrik. The latter is easily recognizable by its box tail.

"All the German machines are actually inferior to our machines as regards speed and ceiling. Even von Richthofen, in his diary, complained that his machines compared unfavorably with those of the Allies both in speed and ceiling.

"The same type of engine is almost universally used, namely, the 260 hp. Mercedes, which has 6 cylinders. It is a long stroke, low revolution, upright engine and has a minimum number of parts, making standardization easy.

"As regards the pilots themselves, little can be said that is not already known. They seldom attack unless the odds are 3 to 1 in their favor and even then fight only over their own lines. The Hun flies, not for pleasure, but because he has to. He never comes across the lines to seek trouble as the Allied aviators do."

Describing the photographic work, Major Segraves stated that the photographing planes are always accompanied by two or three fighters who aim to protect the photographer, who, contrary to the German plan, sticks to his job despite an attack until he has the pictures he started after. The photographs shown on these pages were taken by British aviators and in the majority of cases were secured only by "sticking" despite attack.

The system of airplane construction, in England, works for very efficient results. The British air service offices in France send in their requirements for new machines to the Air Ministry at London. This division in turn notifies various airplane makers in the country, by means of special blanks, of just what types of airplanes they require. The forms used tell what the speed, climb, ceiling, etc., must be. Each manufacturer in turn studies the notice, and if he believes he can undertake the job, so notifies the Ministry. He is then sent sufficient money to proceed with blue prints and the manufacture of three airplanes. When these are completed they are sent to what is called Martlesham Heath, the greatest experimental air field in England, where they are given a thorough trial under supervision of a trial board. Those airplanes found to be best of all sent in by the various makers are then recommended as the new type. Blue prints are ordered from the original manufacturer and sent to each airplane factory with orders for specified numbers.

A New Type of British Tank—The Whippet

The name given to this newer type of Hun destroyer carries with it a suggestion of speed, but the speed developed is, of course, great only relatively. It is about 12 m.p.h. maximum. This British light tank corresponds to the "mosquito" tank of the French and the American two-man tank, which will soon be heard from

Gile Engine Employs Sub-Piston

Works on Two-Stroke Principle, with Piston-Controlled Port for the Inlet and a Poppet Valve in the Head for the Exhaust

A TWO-STROKE engine embodying several rather novel principles has been placed on the market by the Gile Marine Engine Co., 50 Congress St., Boston. The operation of the engine differs materially from that of the conventional two-stroke engine, and some of the disadvantages usually encountered with that type are overcome.

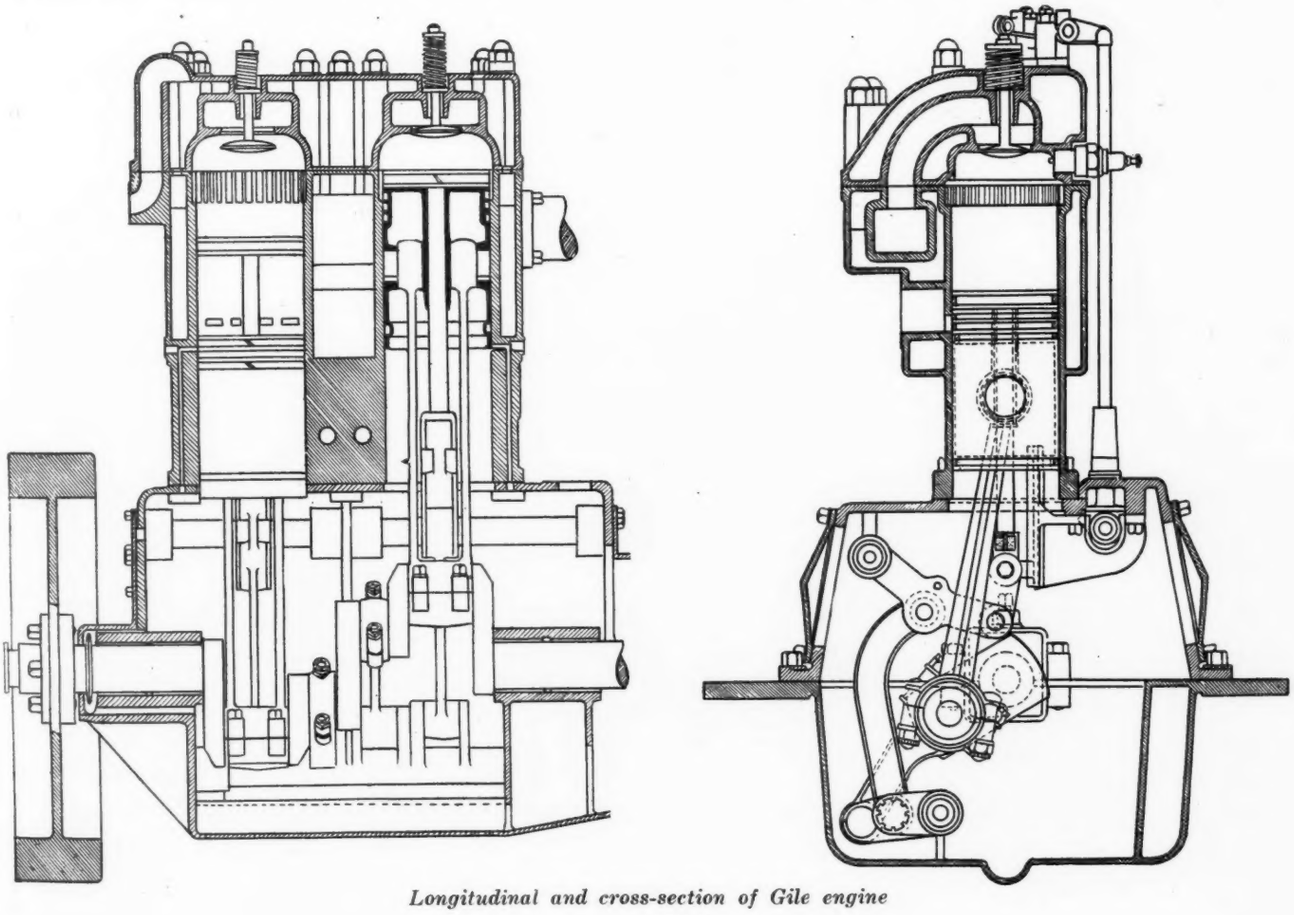
In addition to the regular trunk piston or working piston, there is in each cylinder what is referred to as a sub-piston which is operated from a special crank on the crankshaft. From this special crank a short connecting-rod leads to a lever arm pivoted near the base of the crankcase. On the same shaft on which this lever arm is mounted, there is another lever arm from which a link connects to a somewhat longer single arm lever in the upper part of the crankcase. The free end of this single arm lever connects through a short link to the lower end of the piston rod of the sub-piston. The motion of the piston rod is steadied by means of a cross-head moving up and down in a guide secured to the crankcase.

Principle of Operation

During the power stroke the main and sub-piston both travel in the same direction and at substantially the same rate of speed. This continues until they have reached a point where the main crank is within 45 deg. of the bottom dead center, at which point the exhaust valve begins to open. As soon as the exhaust valve opens, the sub-piston is gradually stopped by the rocker arm movement described, and it then starts on its return stroke. During this return stroke, the sub-piston scavenges the cylinder of the burnt gases, and at the same time it draws in a fresh charge of gas from the carbureter through the intake ports in the cylinder walls near the lower end of the stroke. These ports are uncovered by the main piston during the last part of its downward stroke.

During the time that the main piston uncovers the inlet ports at the bottom end of the stroke and closes them again, the sub-piston has reached the top end of the stroke and thereby has drawn in a full charge of fresh gas into the space between the two pistons. While the main piston completes the upward stroke, the sub-piston is practically stationary in its uppermost convention. It will be observed from the sectional view of the engine, herewith, that there is a series of flutes in the cylinder walls at the upper end, which afford a passage for the gas in the space between the main piston and the sub-piston, whereby it can get into the space above the sub-piston. Therefore, when the main piston reaches the upper end of its stroke, all of the fresh air has been transferred to the space above the sub-piston, or what is generally referred to as the compression chamber. As the transfer of the charge goes on at the same time as the compression of same, the gas passes through the flutes at considerable speed, and this has a tendency to keep the flutes clean and open. As the main piston reaches the top end of its stroke the gas has been fully compressed and is then fired by the ignition spark.

(*Continued on page* 238)



Longitudinal and cross-section of Gile engine

"Laying the Egg on the Hun"

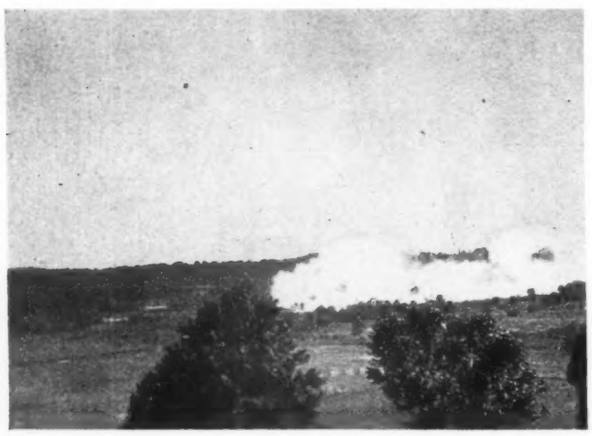
How the Aviator Uses Smoke, Incendiary, Demolition and Illuminating Bombs—Flare Lighting for Landing and Observation Work—The Training of a Bomber

GAS, smoke, incendiary, demolition and illuminating bombing exhibited in Washington at Congress Heights before important Allied and American officers recently demonstrated the close relationship between trench warfare and aviation. The exhibition was given by the trench warfare section of the engineering division of the Ordnance Department. The vast improvement in flares, bombs, and in the devices for shooting them was convincingly demonstrated. A DeHaviland airplane equipped with two Liberty engines fired four demolition bombs of medium size from an altitude of 2,000 feet, aiming at a target 30 feet in diameter and striking within a radius of 200 yards with each shot. Each bomb burst with a terrific concussion, tearing great holes in the ground, leaving craters 30 to 40 feet in diameter. The bombs used in the exhibit were made for demonstration purposes and of but one-fourth the effectiveness of the bombs used by the night bombing airplanes, which comparison shows the havoc created by the normal bomb.

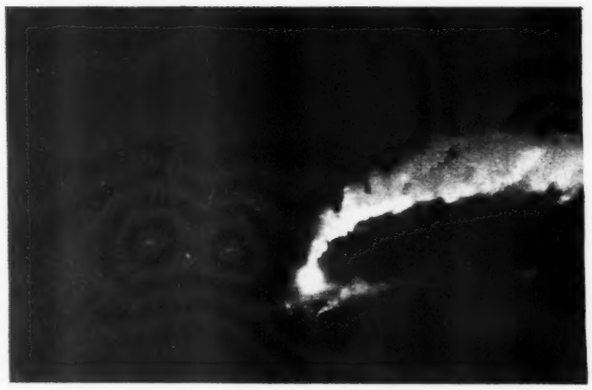
The demolition bomb used by airplanes. These bombs tear craters in the ground 80 to 200 ft. in diameter

The illuminating bomb. This bomb is dropped by the aviator over the city he intends to bomb. At about 2000 ft. it bursts into a 30-ft. parachute with a light below of 350,000 candlepower, illuminating over a radius of 2 miles. The aviator is not blinded by the light nor revealed by it

Smoke bombs discharged from the plane burst, spreading a great pall of white smoke which combined with other smoke clouds discharged by ground soldiers into a screen that filled the entire valley, completely hiding



At left—Explosions of smoke bombs dropped from an airplane. At right—Smoke screen, the result of smoke bombs dropped from an airplane and thrown by ground soldiers. The screen effectively hides operations from the enemy

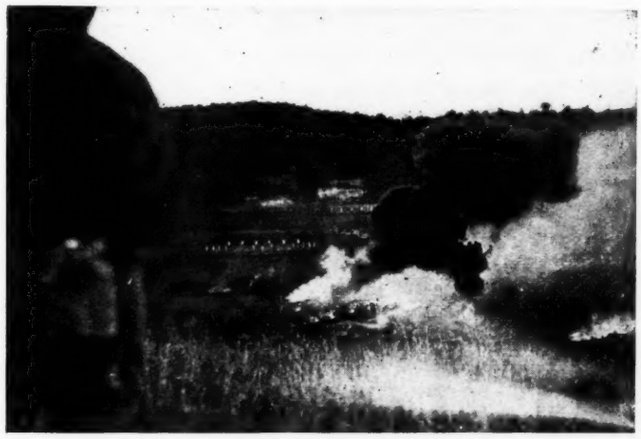


At left—The night flare. Two huge flares developing hundreds of thousands of candlepower are arranged, one at each end of the flying field, where they serve as beacon lights to aviators many miles distant. At right—The night flare fully developed. Here the telegraph post and the group of soldiers standing close to the flare box show how far into the sky the flare reaches

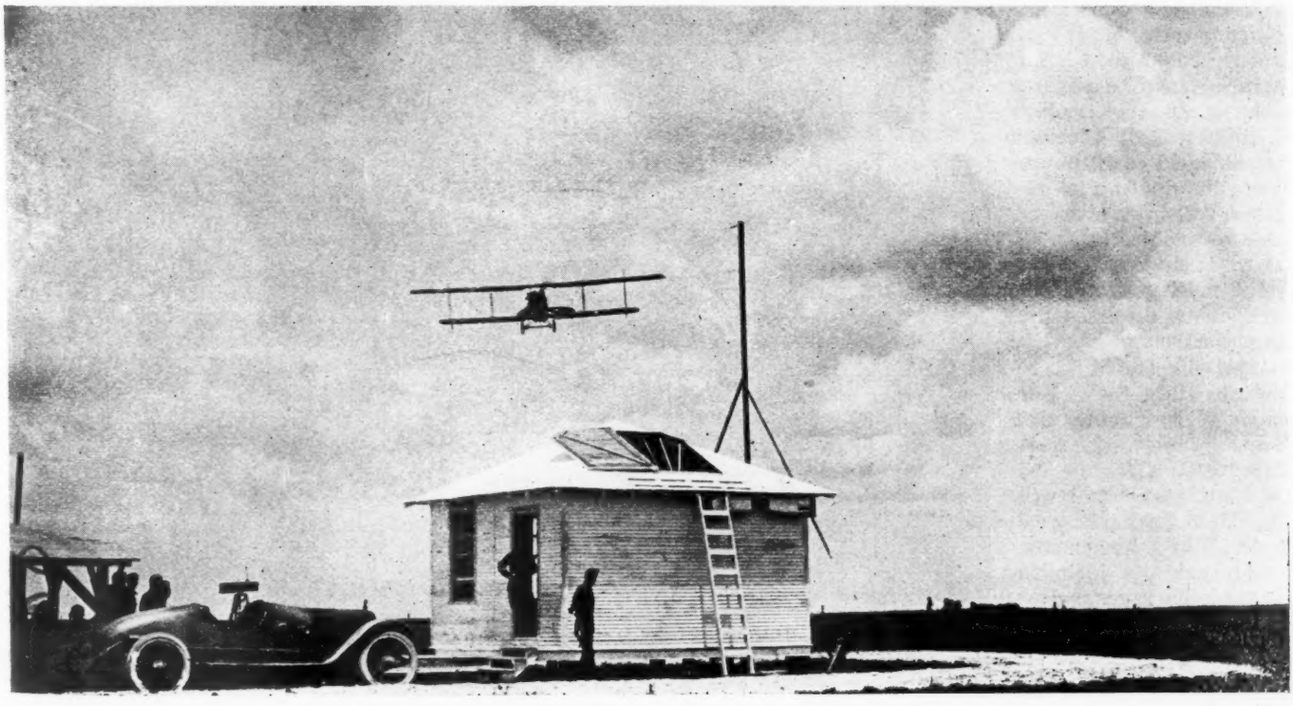
the operations of those on the other side. Gas bombs discharged clouds of gas fatal to any one within inhaling distance. Incendiary bombs containing inflammatory material splashed the earth with flaming fragments, starting huge fires almost as promptly as they exploded.

Nightfall developed a series of brilliantly lighted exhibits. Rockets were discharged which carried small parachutes and various colored lights high into the air. As the stick of the rocket broke from the stream of sparks the parachute on each opened and hung in the sky, displaying a small light with red, blue, yellow or green color. Each color has a meaning to the night bomber returning from or proceeding on a bombing expedition. Hand pistols known as "Very pistols" were also exhibited. These are used both by aviators and by the soldiers in charge of the hangars and at the trenches. They discharge parachutes with different colored lights to a distance of 50 feet and are also used for signaling at night.

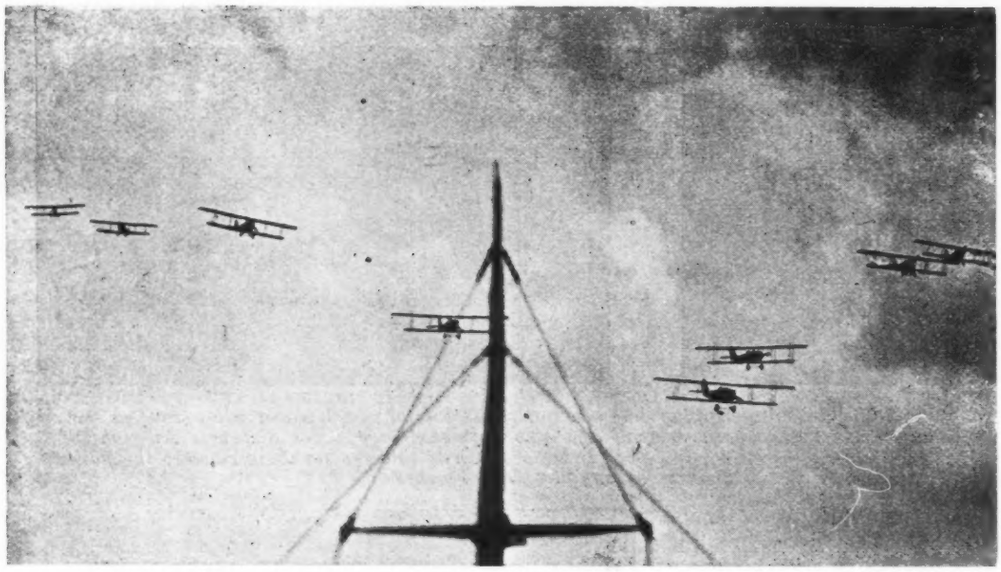
Methods of illuminating hangars by night were displayed. A series of intensely bright lights are spread



The explosion of an incendiary bomb released by an airplane. These bombs explode into hundreds of pieces of highly inflammatory material. They quickly burn even the green grass at the demonstration field



The preparatory bombing stage school house. This house, with its roof open to the sky, is equipped with camera obscuras and Batchelor mirrors. The fliers are checked and traced on charts



The flying formation of a bombing squadron, with the leader lowest and the following planes arranged in pairs on each side forming a V, graduating in altitude, with the last planes the highest

around the outer edge of the landing field, making it easy for the aviator to effect a landing. Another method of lighting up the field is by means of two flares, one at each end of the field, which develop a light so powerful that the observers of the exhibit, standing on a bluff 2,500 yards distant, could plainly discern every movement of the individual soldiers below.

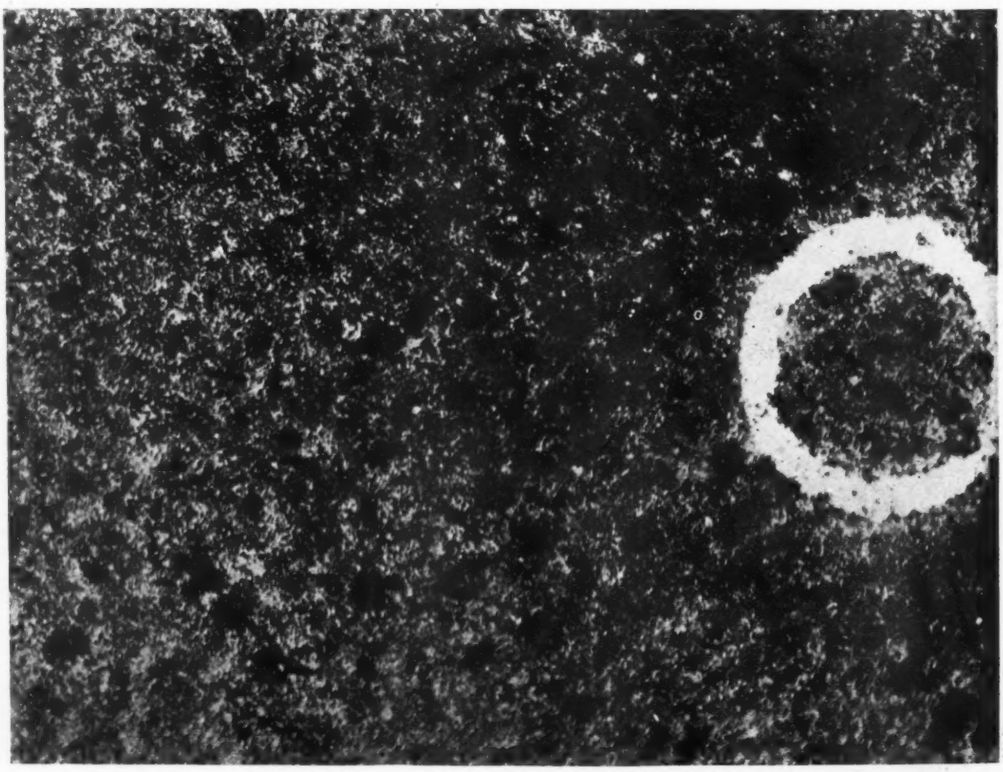
A most interesting exhibit was the aerial flare bomb which is discharged by the night bombing airplane to enable the aviator to see and select easily the objectives for his demolition bombs. This bomb is 36 in. in length and 8 in. in diameter, contains a parachute and material throwing an intense light. The bomb is discharged at a high altitude and bursts at about 2,000 feet, the parachute spreading over a 30 foot radius with the light developing 350,000 candlepower and illuminating a radius of 2 miles over the aviator's objectives. It is so arranged that the light neither blinds the aviator nor discloses him to the enemy.

The display did not go into all of the 150 or more devices being produced by the trench warfare section, some of which are new and will be first employed against the enemy. Other exhibits included grenade barrages, salvos of grenades, knapsack flame projectors and hand gas attacks.

It is said that the aviators are now equipped with three new devices on their planes, rendering bombing considerably more effective. One of these provides a new method of aiming bombs with considerable accuracy, another measures the speed and altitude of the machine for the aviator and the third is the illuminating bomb mentioned above.

Night bombing is just becoming an efficient and effective war measure. There were no aerial bombing organizations in the allied flying corps in the first year of the war, when all planes were used for observation purposes only. To-day 25 per cent of the aerial forces are bombing squadrons with 12 machines in each.

Originally the bombing, performed by volunteer pilots, was concentrated on camps and cantonments. Only three or four bombs were carried and dropped. They were made from artillery shells and seldom reached the mark. Occasionally showers of small steel arrows were spilled. The Germans, however, commenced day bombing of cities early in 1915. The Allies in a reprisal operated their first day bombing expedition against Karlsruhe in October of the same year. Late in 1915 the French began night bombing, which was adopted by the Germans in August, 1916.



The circular ground target used for training. The photograph shows the work of embryo bombers and the effect of the bombs on the ground

To-day several squadrons of bombing machines go over the lines frequently and completely destroy their objectives. Unfortunately the Allies' air forces have to travel over much hostile territory defended by anti-aircraft guns to attack German cities, while the enemy can attack French cities by short flights beyond our lines. To overcome this obstacle we are developing the huge Caproni, Handley-Page and DeHaviland night bombing planes, recently announced, which will carry sufficient fuel for the long excursions and armament for protection. These bombing squadrons will be escorted by 18 fighting planes over the lines of the enemy for protection against the enemy fighting planes, after which they are left to their own devices, as the fighters do not carry sufficient fuel to accompany the bombers on the complete round trip. The bombing planes fly in a formation similar to that of the fighting planes, which is a V with the leading plane lowest and the following planes arranged in pairs on each side of the V and graduating in altitude with the last planes the highest, much like a flight of stairs. This permits the higher planes to pounce on enemy planes attacking the leaders below.

Bombing crews, comprising a pilot and a bomber, are given highly specialized training in flying, aiming, firing, navigating and fighting. This training is essential, else fliers traveling many miles over hazardous country would be likely to achieve their objective only to see the bombs dropped strike on open ground, or they might lose their route and be obliged to descend in enemy country, or again they may be met in combat by enemy planes. Consequently, they must be trained to meet all emergencies.

Shooting bombs is much like shooting a rifle. The sights and wind-gage are set, the rifle held properly and the trigger pulled.

Elemental training is given the bomber and pilot in a preliminary ground school. It includes a three months' course in the theory of flight, aeronautic engines, instruments and airplanes, plain and aerial navigation, astronomy, meteorology, map reading, machine guns, bombs, artillery observation and radio telegraphy. The course is so complete that many of the students are able to build workable machines after completing it. It has been prophesied that after this war the country will be overrun with homemade airplanes constructed by the present students and graduates of the military aviation course.

Three bombs just released from an airplane falling toward the objective. The bombs are still in the horizontal position, with the one above just beginning to turn its nose downward

The night bomber with plane set, bombs in place, ready for his expedition. In the lower left-hand corner can be seen bombs and rockets

"Laying an Egg on the Hun"

"Laying an egg on the Hun," which is the term for bombing, follows the preliminary training when the graduates who stood highest are permitted to volunteer as bombers. They go to a bombing school, while the bombing pilots are sent to primary flying fields. The bombers thus advance more rapidly than the pilots, as they, at the bombing school, meet pilots already trained with whom they will work. The pilots and the bombers are urged to cultivate each other to form congenial teams, adding efficiency in this way, since from this time on the team mates work and sometimes die together. In the preparatory bombing stage, the bombing crews fly over a course over camera obscuras and Batchelor mirrors located in houses on the ground. The houses are open to the sky and the course of the planes flying is thus checked and traced on charts and show the smallest errors of the fliers.

Bomb dropping instruction follows, first from low altitudes, 3,000 to 4,000 feet, and then from higher points, 10,000 to 12,000 feet, as the aim of the bomber improves.

The target is usually a circle 25 feet in radius, painted on the ground, not hard to hit with a rifle at the distance but exceedingly difficult to strike from an airplane moving at 100 m.p.h. and far from steady. Well-trained bombers can score 7 hits out of 10 shots, while some of the best marksmen do even better.

After the marksmanship test is concluded the bombers usually fly to 10,000 feet altitude, at which height they are comparatively safe from anti-aircraft shots. Even at 4,000 feet the German batteries score 1 hit for 10,000 shells. At 10,000 feet they average less than 1 hit to every 50,000 shots.

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BRITISH iron and steel manufacturers have agreed to form a national council on trade policy, which will be representative of all the ironmakers of the country, and probably of labor interests as well. It will deal with trade matters only, and will not concern itself with technical questions.

The Labor Problem and Export Trade After the War

Foreign Business Begins at Home—Labor Turnover, Wages and Manufacturing Costs and Efficiency Are the Factors to Be Considered First

By Edward N. Hurley
Chairman United States Shipping Board

WITH something like 25,000,000 tons of merchant shipping to be employed inside of two years, it is none too early to look around for cargoes, both in this country and abroad. So, amid all his splendid effort in producing equipment to win the war, the American manufacturer must be asked to take thought for to-morrow and think in terms of shipping and foreign trade. This might appear like a distraction now—something which will take the attention from the supreme duty of winning the war. But, far from being a distraction, it fits in with war production and war psychology. While our factories and factory employees are building war material to-day, they are also building foreign trade, if we can only see things whole and make one factor work with another.

When the business man turns his attention to export trade he looks abroad and thinks of foreign customers. But foreign trade actually begins in his own factory. He looks abroad and studies such factors as ocean freights, foreign exchange, export packing and international salesmanship. If he would look into his own factory first, and study factors close at hand, such as labor turnover, wages, manufacturing costs and efficiency, he would be laying solid foundations for export trade.

With the bugaboo of cheap foreign labor haunting us in former years, we got into the way of thinking that export trade necessitated some lowering of wages and American living standards. Probably that was crooked thinking before the war. Certainly it is crooked thinking now, for the war is bringing other nations closer to our American standards of wages and living.

True development of foreign trade in our factories means better and better American standards.

In most of the countries of the world there will be a decided shortage of labor after the war. That country will best succeed which protects its workmen by improving their living conditions, guaranteeing a fair return for labor, protecting workmen and their families against accidents and idleness, and making workers better citizens. The country taking those measures will be the country that develops and makes products most economically, and will perform a world service by making goods at the prices fair to other nations.

In the Army and the Navy we have a visible mobilization of man power for results in a foreign country. If we could have the same visible mobilization of man power in our factories for foreign trade it would be a splendid object lesson for those who manage the factories and make the export goods.

Cheap Labor Will Not Win Export Trade

To think of cheapness in connection with foreign trade is just as wrong as trying to pin bargain tags on soldiers. Foreign markets are not going to be won or held by cheapened American workers, or bargain methods in American life. As manufacturers we have got to lay the foundations for foreign trade by going out into our factories and studying labor and costs together. We can sell our export products at reasonable prices by increasing wages along with output, and decreasing the losses caused by labor turnover, untrained workers, spoiled materials and other inefficiency.

Our experience along these lines in the Emergency Fleet Corporation has been most encouraging. With the task of creating new shipyards in a few months, and manning them with several hundred thousand workmen, most of whom came from other trades, we ran into about every difficulty, and problem, and tangle that could conceivably arise in management. On a large scale we effected an adjustment of man power such as is called for now in preparing the average American factory for the export trade which we will need to keep our ships employed.

To get production at unheard-of speed and in record-breaking quantity, we did something simple and fundamental—and thoroughly human. This was nothing more nor less than arranging wages so that, while our workers produced more for us, they were also able to produce more for themselves. We established the rule that a piecework wage rate set by any shipbuilder must stay in force during the period of the war. Any manufacturer who sets a piecework rate, and then reduces that rate if he finds that he has made a mistake against himself, is doing a great injustice to his employees. Profiting by our experience in the shipyards, I should like to see Congress pass a Federal law making it compulsory to keep every piece rate in effect one year. That would protect workers and furnish a real basis for increased production.

A Lesson from the Shipyards

We found ourselves confronted with enormous losses and dangerous delays through lack of skill in special trades needed by workers in the shipyards, and also through the cost of labor turnover. To find 100 capable shipbuilders who would stick on the job it was necessary to hire and try, discharge or lose 1000. Every manufacturer will recognize in these difficulties exactly the difficulties that he himself faces from day to day, and which put excessive burdens of cost upon his products. In the shipyards we got around those difficulties by establishing training centers for the various trades we needed, and also by appealing to the splendid spirit which lies in the average worker. We had to train everybody, from the boy who heats rivets right up—foremen and superintendents, and even executives. Starting with a little nucleus of skilled riveters, caulkers, reamers, carpenters and so forth, we took them out of the shipyard for a time and taught them how to teach their trades to others. Then they went back into the yards to teach green recruits, not in any school or class, but on actual ships, while doing the regular day's work. Under this system it was possible to quickly bring green gangs up to about 80 per cent of the efficiency of skilled workmen.

As fast as these men learned their trades and acquired high earning power under our protected piece rates, they became steady enough, and the costly item of labor turnover began to drop. After that nothing more was needed but the appeal for patriotic service. We found that the shipworkers would not only stick on the job like soldiers, but that in their inherent spirit as fighters and loyal Americans there was an enormous reserve of man power to draw upon—a reserve capable of meeting every demand and every emergency, with power to spare.

That reserve of spirit exists in every American industry. War has brought it to light where executives can see it, and to develop this great reserve for foreign trade is distinctly the executive's job.

Training Girls for the Drafting Room

Making Tracers by Intensive Methods to Meet the Demands of the Day—A High Degree of Skill Acquired in 4 to 6 Weeks' Course

FOR many years the Westinghouse Electric & Manufacturing Company has gone extensively into the training of employees. Educational courses in practical shop work have been conducted on an elaborate scale in the company's various manufacturing plants as well as in special night schools. The production of tracers, draftsmen, pattern makers, foundry men, machinists, tool makers, electricians, and other classes of skilled workmen has been as much a part of the company's regular business as has the making of electrical equipment.

In September, 1917, the class conducted by the educational department for instructing boys in tracing was opened also to girls. The class had originally been operated on a part-time basis, the boys receiving 4 hr. instruction a week, while still attending to their regular duties in the offices or works. In addition to this instruction the class is now operated full time for the intensive instruction of girls. Practice is given in lettering and tracing, with some instructions in drawing.

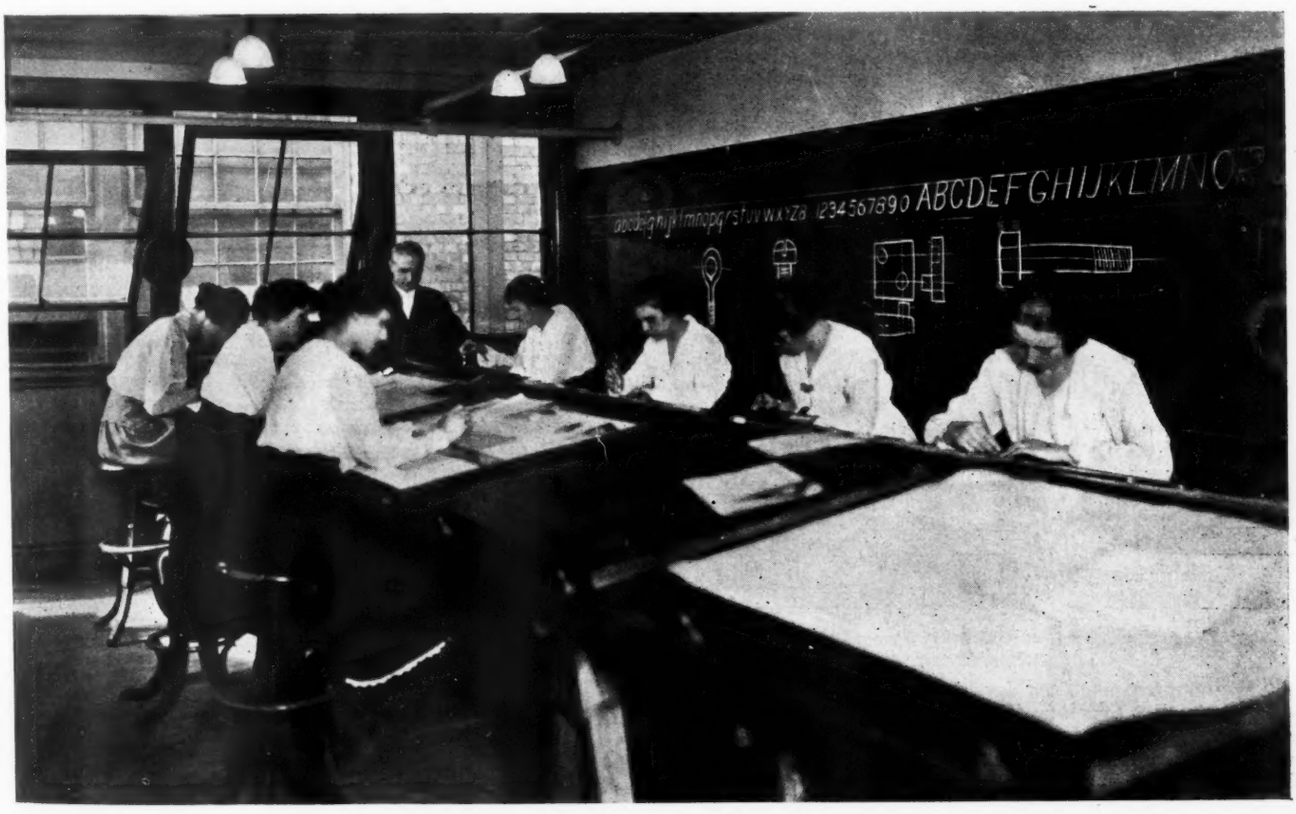
The girls who are selected for this intensive training have had at least two years of high school education. The instruction covers from 4 to 6 weeks, during a part of which time the student makes actual working tracings.

Thirty-two girls have taken this training course and have been placed in regular tracing positions. Several of these girls have qualified for more advanced work and are receiving 4 hr. per day instruction in detailing.

On the first of this month a special section of the department for training machine tool operatives was opened for women. This training section is equipped with standard machine tools and the girls will be instructed in the lighter kinds of standard work.

The methods adopted by the Westinghouse educational department for converting raw material in the form of inexperienced young men into finished draftsmen are the following: Beginners are first placed in the drafting room as tracers. If aptitude for the work is shown, an opportunity is given them to prepare for more advanced work in the department.

This preparation consists of experience in the shops on pattern making, foundry and machine shop work, and systematic training in the drafting office on the various phases of the work. Six hours per week are spent in the special training section conducted in the Educational Department. This instruction covers design problems involving various applications of mathematics, physics, mechanics, materials, shop methods, estimating and cost calculating and tool design.



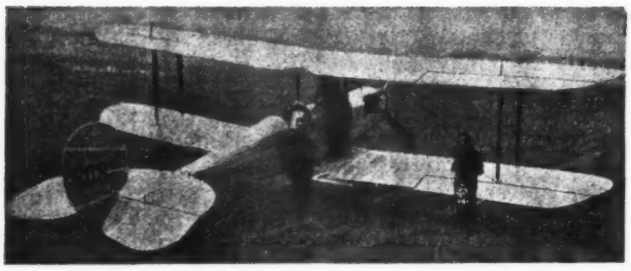
A class of girls receiving intensive training in tracing in the educational department of the Westinghouse Electric & Mfg. Co. Several of the girls so trained have qualified for advanced drafting work

Products of the Royal Aircraft Factory

Models of Planes Developed at the Establishment of the British Government—Further Development Work Left to Private Concerns

SINCE 1912 the British Government has operated works for the production of military airplanes in competition with private concerns. Innumerable types of machines have issued from these works, some successful, but more rather deficient in comparison with contemporaneous designs by private builders. Recently the R. A. F., as it is known, has been reorganized into the Royal Aircraft Establishment, and *The Aeroplane* takes advantage of the occasion to review the development work done at the R. A. F. and, with the permission of the Air Ministry, to publish photos of many of the models turned out by it in the course of time.

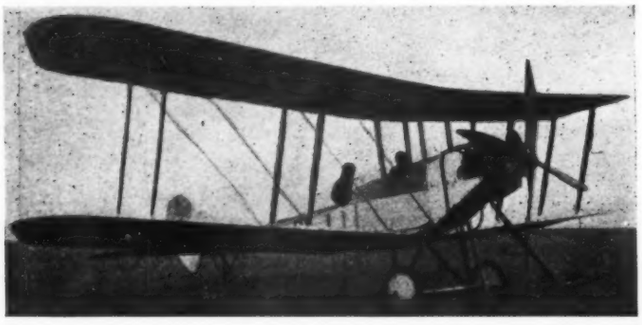
The nucleus of R. A. F. was the Balloon Company, R. E., of



The original R. E. built for speed early in 1914 *with 70-hp. Renault engine*

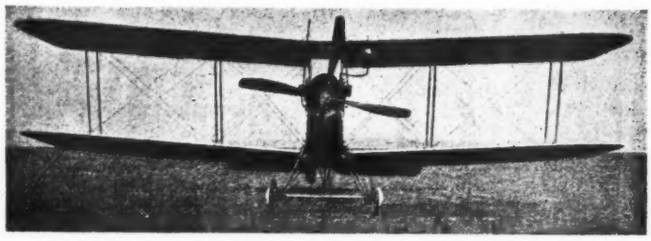
Farnsborough, which controlled all the aerostatic appliances of the British Army and came into being during the first years of the present century. A few years later, when the British Army acquired its first dirigibles, the balloon company was placed in charge of this equipment also. The original establishment and the original name both became inadequate, so additional sheds, etc., were built, and the name was changed first to the Army Aircraft Factory and later on to the Royal Aircraft Factory. Control was placed in civilian hands, and Mervyn O'Gorman was appointed superintendent.

Experiments were made both with privately designed aero-



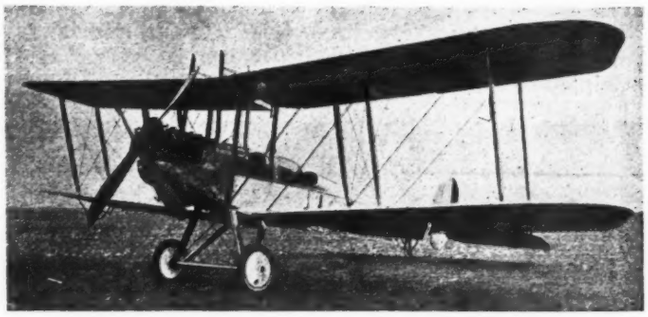
B. E. 2c biplane with 70-hp. Renault engine

planes and with machines developed at the R. A. F., but it was only in 1912 that a machine was produced at the R. A. F. which would really fly. In the summer of 1912 a tractor biplane with a four-bladed propeller, a two-seater, was produced which flew in the British military airplane competition, without competing, however. The machine made quite a respectable showing, as it beat all of the competitors with the exception of that of the late S. F. Cody, whose large machine



B. E. 2d biplane with planes of equal span and ailerons operated by cable

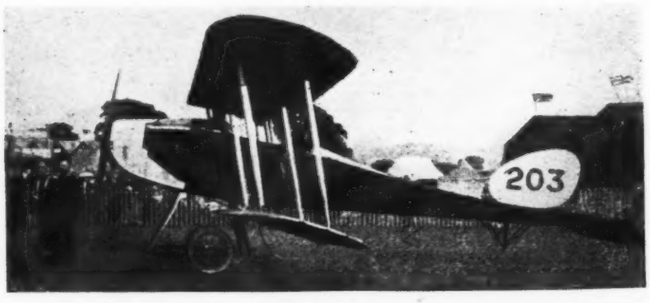
was ahead of the times in the matter of engine power. This R. A. F. tractor biplane, which was designed by Geoffrey de Havilland, now chief designer of the Aircraft Manufacturing Company, Ltd., probably compared favorably with anything produced up to that time. It was designated the B. E. biplane, which stood for Bleriot Experimental, because Louis Bleriot was officially regarded as having originated the tractor type of aeroplane. It was a sort of composite design,



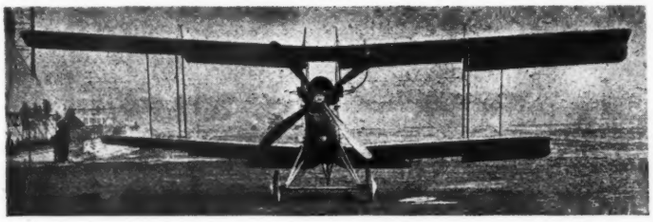
B. E. 2d biplane with 90-hp. R. A. F. engine

embodying features of the Bleriot, Wright, Deperdussin, Nieuport and Avro.

During the next two years the B. E. biplane was produced in a number of variations, the most noteworthy being the B. E. 2b and the B. E. h, the latter with a Gnome engine inside a coal scuttle cowl. Shortly before the outbreak of the war there arose a craze for inherent stability, and the first B. E. 2b was evolved, in which this feature was aimed at. This differed from the original B. E. machine in that the



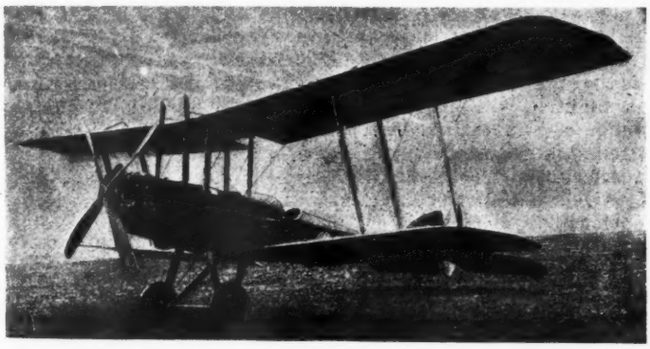
Side view of B. E. 3, *which is very similar to B. E.* 4 *and B. E.* 8



Front view of B. E. 2c biplane with 90-hp. R. A. F. engine

wings had considerable dihedral, and the warp control had been replaced by double-acting ailerons. An enormous tail, more or less rectangular in shape, and a big fin in front of the rudder, combined with proper weight distribution, made the machine perfectly stable, although her lift was not all that might have been desired.

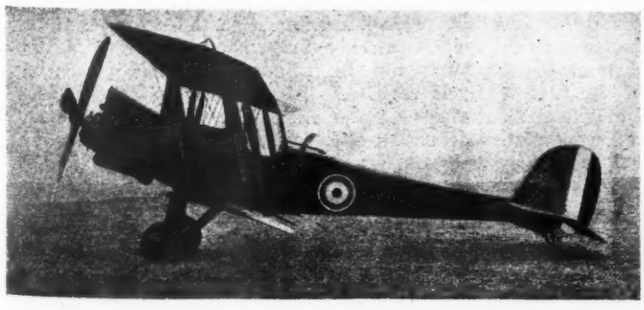
Later models were equipped with more powerful engines built by the R. A. F. These included the B. E. 2d, B. E. 2e and B. E. x. The first B. E. 2 had a 70-hp. Renault engine and a single open cockpit for the pilot and gunner. The B. E. 2b had separate cockpits and a better streamline fuselage. The B. E. 2b was the first machine designed for inherent stability, and it also had a marked forward stagger to the upper plane. The B. E. 2d was similar, but had a faster wing section. In this type the under-carriage skids were



Three-quarter front view of B. E. 2e biplane with 90-hp. R. A. F. engine

abolished, the exhaust pipes were carried up over the upper planes and the machine generally was streamlined down to get increased speed. Most machines of this type were equipped with a 90-hp. R. A. F. engine instead of a 70-hp. Renault.

A marked change was made in the B. E. 2e type, which had a single pair of inter-plane struts outside the center section of the wings, and a big overhang to the upper planes, in which overhang the ailerons were connected by a slender tubular strut to the small lower ailerons, this strut being outside the line of the inter-plane struts. This machine also was designed to give more lift than its immediate predecessor, but its power plant and fuselage were practically the same. In all of these machines the passengers sat in front of the pilot.



R. E. 8 biplane with 130-hp. R. A. F. engine

Some months before the outbreak of the war a need was felt for faster and larger types of aeroplanes, and the R. E. (Reconnaissance Experimental) was produced. The first of this type was a modifled B. E. with a single pair of struts outside the center section on each side. This was equipped with a Renault engine of 70 hp. It was fast, but did not have much lift. A subsequent type, the R. E. 4, which was fitted with an Austro-Daimler engine of 120 hp., had good climbing ability and, piloted by Norman Spratt, easily beat the existing height record. It was a very sightly machine, but is believed to have involved some aerodynamic defects. Later developments of this type included the R. E. 5, R. E. 7 and R. E. 8, these being used as self-protecting artillery observation machines, night bombers and contact patrol machines. They were fitted with 12-cylinder R. A. F. engines of about 130 hp.

Three-quarter front view of R. E. 8 biplane with 130-hp. R. A. F. engine

For a period in 1916-17 they were very unpopular, but subsequent changes in design made them both pleasanter and safer. By this time, however, they were already becoming obsolescent.

The first aeroplanes fitted with machine guns were of the pusher type. Machines of this type manufactured by the R. A. F. were known as type F. E., which letters indicate Farman Experimental. These machines were rather queer looking, and the second type brought out is described as "a bull-nosed brute with a deep nacelle, at the rear of which was a 70-hp. Renault engine driving the typical R. A. F. four-bladed propeller." The Bleriot shaped, Wright braced warping, B. E. type planes were retained, as was also the B. E. type pear-shaped rudder hitched to Farman type tail booms. The machine was inclined to spin, and it was not long before an accident occurred in which the passenger was

R. E. 4 with 120-hp. Austro-Daimler engine which established a new altitude record

killed and the pilot crippled. Later examples, fitted with rigid wings, ailerons and Beardmore engines were more satisfactory in their performance and were largely used at the Front, first for fighting, and second for night bombing. The official significance of their name has changed from Farman Experimental to Fighting Experimental. Colloquially they became known as Feeplanes.

A single-seater pusher fighter with a Gnome engine, on the lines of the de Havilland 2, and known as the S. E. 8, gave quite a creditable performance. Another model, known as the S. E. 2b, was developed, and the very first example of this type to cross the Channel landed behind the German lines and was captured without being seriously damaged.

Next the R. A. F. attacked the problem of the fast single-seater and produced the F. E. (Fighting Experimental) type.

F. E. 2b biplane with 120-hp. Beardmore engine and trip wheel under carriage

Three-quarter rear view of S. E., showing position of Lewis gun on top plane

In the F. E. 2 a special attempt was made to reduce the head-on resistance, only a single pair of struts being used between the wings and a round, tapering fuselage. Driven by a 160-hp. Gnome, with 24 cylinders, this small machine exhibited great speed, but otherwise its performance was poor, and it was almost impossible to control. The type of engine was also very unreliable.

An improved design, the F. E. 5, with Hispano-Suiza engine, showed a better all-around performance. In this type, stability was developed to such a degree as to be a fault, for the machine was difficult to maneuver rapidly in air fighting. This gave the advantage to especially controllable enemy aeroplanes in that they could hold their own by keeping on fighting inside the F. E.

The New Giant German Airplane

THE French aviation authorities recently announced officially that during the night of June 1-2 a giant enemy airplane provided with four motors and carrying a crew of eight men had been brought down near Nanteuil-le-Haudoin—about half way between Soissons and Paris. Further particulars concerning this machine have been supplied by a correspondent on the French front. The machine is stated to be of the "Lizenz" model, but we accept this name with reserve, as it is merely the German word for "license." The following numerical data are furnished by the correspondent:

Engines	four of 300 horse-power.
Span of wings	141 ft.
Length overall	92 ft.
Weight, empty	20,300 lb.
Weight, fully loaded	32,200 lb.
Weight of bombs carried	4400 lb.
Maximum speed	75 to 80 miles per hour.
Armament	four machine guns.

The crew of eight apparently consisted of the pilot, an assistant pilot, two gunners and four mechanics.

It is of some interest to analyze these data as far as we are able, and to compare this new type of machine with the Gotha or Friedrichshafen bombing machines, the largest machines of which, hitherto, we have had definite information. We can assume, we think, that the engines are of the Mercédès 260-horsepower six-cylinder design, for it seems unlikely that the enemy has developed a new type of engine and applied it to a new type of airplane. The Mercédès engine of the model named consumes fuel and oil combined at the rate of 146 lb. per hour at normal speed. The crew can be reckoned at 180 lb. per head. The Friedrichshafen machine is provided with tank capacity sufficient for about 3¼ hours of flight at full speed, and usually carries a crew of three, although accommodation is provided for four. With these figures we get the following comparison of weights:

	Friedrichshafen. lb.	"Lizenz." lb.
Weight, empty	5929	20,300
Fuel oil for 3¼ hours	948	1,896
Crew	540	1,440
Bombs	1229	8,564
Total weight	8646	32,200

It will be noticed that the weight of bombs carried by the new machine, according to this reckoning, is nearly twice as great as the figure named in the unofficial account. If the latter figure is correct, it would seem that the machine is provided with sufficient fuel and oil capacity for some 5½ hours' flight at full speed. It would thus appear to be capable of carrying nearly two tons of bombs to a point some 200 miles from its base and returning. The German airdromes in West Flanders are about 140 miles from the center of London, as the crow flies. Hence the new machine has been designed, it might be presumed, not to bring new regions within the range of airplane attack, but, primarily, to enable bombs of greatly increased weight to be dropped on the targets already reached by the Gotha and Friedrichshafen.

We do not know what the speed of the Gotha is, but it is obvious that it must, in order that the machine may be able to bomb London and return within three hours, be at least 100 miles per hour. It will be seen, therefore, that by doubling the power and by being content with a materially lower speed the enemy has nearly quadrupled, in the new machine, the weight of bombs carried. To obtain the increased lift it is not, of course, sufficient merely to increase the power; the size of the machine, as a whole, must also be increased. The span of 141 ft. in the new machine compares with 78 ft. in the Friedrichshafen, and the overall length of 92 ft. with 42 ft. Thus the actual area of the target presented by the machine is approximately four times as great as in the case of the Friedrichshafen. This figure has, further, to be multiplied by some factor greater than unity, in order to allow for the effect which the reduction of the speed has on the probability of successful attack by gunfire.—*The Engineer.*

Gile Engine Employs Sub-Piston

(*Continued from page* 229)

From this point on, the two pistons travel in a downward direction together and the cycle is then repeated.

It is claimed for the Gile engine that it burns kerosene as readily as gasoline. This is explained on the theory that the fuel particles are thoroughly broken up in being passed through the small flutes in the cylinder walls. No preheating of the fuel or air is required. It is stated that observation and chemical analysis of the exhaust gases show substantially complete combustion of kerosene as well as of gasoline.

The exhaust valve is located centrally in the head and is operated by means of a cam through a mushroom type cam follower, a tappet rod extending up the side of the cylinder, and a tappet lever. Another peculiarity of the engine design is that the exhaust manifold, which is of square cross section, runs alongside the cylinder block, being cast integral with the cylinder casting and completely surrounded by the water-jacket.

British Post-War Industrial Plans

Committee for Engineering Trades Makes Report Containing Recommendations as to Methods to Be Pursued During the Reconstruction Period and Later

IN Great Britain the term "engineering" has a somewhat different meaning from that usually given it in this country. What is referred to as the engineering trade is what we in this country would call the mechanical industries or machinery manufacturing industries. A report has recently been made by a departmental committee of the British Government dealing with the prospects and requirements of the British engineering trade after the war. This contains a number of recommendations which should prove of interest to American manufacturers. One of the measures requested of the Government is a total prohibition of imports of engineering material from present enemy countries for a period of at least one year from the time peace is concluded. Exceptions might be made in special cases where imports are advisable in the national interest, and in such cases importation is to be made under Board of Trade license.

Difficulties of Controlled Firms

In the opinion of the committee, the firms controlled by the Government are entitled to special consideration. Most of them are engaged on work for which there will be no demand in peace times, and the change-over from war work to peace work will entail great difficulties. Labor difficulties, it is believed, will be more accentuated than in uncontrolled plants. The knowledge that work is being done without competition for the Government has produced a feeling among workmen—and indeed among the staff—that inasmuch as the Government pays, the rates of wages can be indefinitely increased and that no particular attention need be paid to cost. In the necessary pressure to produce work urgently required many concessions have been made in the matter of wages, with the consent of the authorities, which would be impossible in normal working. The controlled firms, when the control is lifted, will have the greatest difficulty in reorganizing their payrolls along anything like normal working lines.

In view of these and various other difficulties pointed out it is urged that the controlled firms have their works returned to them unimpaired as to capacity, and that the many and great difficulties which will confront them on their return to normal trade, both as to obtaining orders and reorganizing their works, should be regarded generously by the Minister of Munitions under the powers entrusted to him.

Japanese and Canadian Competition

Considerable competition is expected from the engineering trades of Canada and Japan and the report has the following on this subject:

"As a matter very relevant to the considerations of international competition after the war, it is necessary to refer to the great growth of engineering works in Canada since 1914. We have no details, but report says that with a population of eight millions Canada is now equipped with engineering works capable of dealing with the wants of twenty-four millions of people. If this is true, the competition of Canada may hereafter have to be included in any reckoning of international trade.

"It is not only Canada which promises a large competing output in the future. No engineer can afford to ignore the signs of rising competition from Japan. Intelligence, enterprise and cheap labor combined may easily make Japan a formidable competitor, in spite of her relative lack of coal and ironstone. As yet there are signs only, but to these we think it necessary to draw attention."

Raw Materials

British manufacturers are comparatively well situated with respect to raw materials, but structural engineering firms have at times bought some of their girders and sections and locomotive and car builders their axles and tires from German and Belgian firms. Some of these fear the effect upon their export business if import of raw materials and parts were forbidden.

Some interesting remarks are made in the report regarding trade organization. Undoubtedly, a considerable step has been taken in Great Britain in the direction of working in larger units—not necessarily in the nature of actual amalgamation of firms, but by subdivision of production. So far, no practical steps seem to have been taken by any engineering association, with one exception, toward perpetuating the improvement which is now existing; but the recognition of the faulty system of the past is general and finds expression in conferences and resolutions. The desire for improvement in the future is very evident, and it does not seem beyond the capacity of the abilities of ordinary business men to come to some arrangement which may in the future improve production and eliminate waste. Where amalgamation may not be possible, it seems that firms should in many cases be able to pool their resources.

Large vs. Small Establishments

The chief bar to the attainment of this most desirable result is a characteristic at once admirable and obstructive. While in Germany independence does not appear to be the leading characteristic of the manufacturer, in Great Britain the manufacturer's strong individualism imparts to him the desire to stand alone, to make or mar his own fortunes, to be beholden to nobody, and to be controlled by no one. In this he has been supported by the public, who think the assembled article lacks the guarantee of the manufacturer. It was undoubtedly the multiplicity of small manufacturers closely applying themselves to their trade in the past which produced the engineering trade as it exists in Great Britain to-day. Conditions have, however, changed, and the progress and maintenance of the engineering trade in future depend a good deal upon production upon a large scale, with the minimum of standing charges and of waste. Under the head of preventable waste must be included the waste of effort involved in restriction of output by workmen.

In the view of the committee, however, despite the tendency toward larger units, the small manufacturer will continue to exist. He may not have before him much hope of large profit, but he undoubtedly has great uses in his readiness to adopt and try new things—in the application of his inventive genius, and in the practical knowledge that he himself acquires through actually working in his own shops and in daily contact with his own men. Many of the men at the head of great works to-day, in the capacity of directors, have only a theoretic knowledge of the works they direct as compared with the practical knowledge which their fathers and grandfathers had before them.

Decimal English System Recommended

The committee recognizes the advantages of a decimal system, but makes only a very slight concession to the champions of the metric system. It is held to be desirable that the division of the inch into one-eighth, one-thirty-second and one-sixty-fourth should be abandoned altogether in favor of the division into hundredths, which is already used exclusively for high-class work; it would not be necessary to vary the higher measures, as, with the occasional exception of the foot, they are not much used for precise measurements.

The hundredweight and ton should be replaced by the cental and short tons of 100 and 2000 lb. respectively, the latter in conformity with American practice. The change would simplify invoicing and freight charges, and would be less mystifying to the foreigner.

The statement is made by the committee that it would approve of a similar change in coinage if it were within their terms of reference and provided that the pound sterling were retained as the unit of value for all purposes. They do not consider the dollar a suitable unit. The absurdity of such a complication as 73 tons 13 cwts. 3 qrs. 17 lbs. at £11 17s. 6d. a ton is obvious, and a great saving of time would result both in work and in education by the adoption of decimal notation in connection with the present English bases of measures and coinage.

An interchange of opportunities between factories and universities is advocated. The university work might be greatly assisted by facilities for its students to carry on practical work in workshops while pursuing their university career, so that, as far as possible, the university education might be joined up with practical experience, as is indeed done to a great extent in Scotland and to some extent in England. It is of the utmost importance that university authorities should keep in the closest possible touch with the manufacturers if the full benefit of university education is to be obtained, and for this purpose lectures on technical subjects, and luncheon clubs arranged at which the university authorities and manufacturers meet fortnightly have proved to be most valuable.

Stricter Enforcement of Patents Act Working Clause

It is held that the object of the British Patents Act has been frustrated in many cases by foreigners applying for British patents not with the purpose of working these patents in Great Britain but for the purpose of securing a monopoly of the British market for goods manufactured abroad by owners of British patents. It is suggested that that part of the Patents Act which requires manufacture within Great Britain should be more stringently enforced, and should refer not merely to nominal manufacture or to the assembling of parts made abroad, but to actual manufacture of commercial quantities. In the view of the committee manufacture in Great Britain would be best attained if it were possible to define a proportion of the articles to be manufactured under the patent in that country as against the total import of such article under patents held abroad.

The subject of licenses and royalties is also referred to and the thought is expressed that the clauses of the Patents Act requiring licenses to be granted might be materially improved by providing some competent body to decide as to the reasonableness of the royalties and of the terms demanded for the grant of such licenses without the expense involved in a reference to the court. At present the fixing of such royalty depends practically upon bargain with the patentee. If he is desirous of preventing any manufacture under license, the terms he may demand will necessarily choke off the intending licensee, who will be reluctant to institute proceedings to get a reasonable rate fixed. The obligation to grant licenses is only enforceable if it can be proved that the patentee has not in fact manufactured in this country. This condition is almost prohibitive so far as the intending licensee is concerned. It is suggested that the onus of proving that he has manufactured in Great Britain within the terms of the act should be thrown upon the patentee.

Finally, the report refers to trade prospects after the war. The belief is expressed that for a short time after peace is declared the need for engineering products will be so urgent that prices will be maintained at an abnormally high level till the most pressing demands are satisfied.

General Decrease in Purchasing Power

Reference is also made to reconstruction work in the devastated sections of France and Belgium, and British manufacturers are believed to be ready to allocate a definite proportion of their output to orders for this purpose. It appears to the committee that the purchasing power of the whole world, outside the United States and Japan, will be much diminished, and that the ability to satisfy needs will depend upon ample supplies of raw materials and of engineering products at reasonable prices. Says the committee: "The United States will certainly make a considerable attempt to meet these demands, but the high cost of production there prevailing should enable British manufacturers at anything like normal prices to meet that competition in neutral countries with fair hopes of success."

Book Review

STEAM Road Vehicles, by L. M. Meyrick-Jones. Published by Iliffe & Sons, Ltd., London. Price, 3s. 10d.

This book is intended for the use of drivers and owners of steam trucks and tractors. In England, contrary to the conditions here, steam is a very important factor in road haulage, and its importance has even increased during the war because the fuel of the steamer, coal, is a national product, whereas gasoline and other petroleum products have to be imported.

The author is a practical engineer with long experience of steam engines and he has dealt with their application to road vehicles in a most comprehensive way, the descriptions of the working of the engine, the generation of steam and the means of transmitting the power to the road wheels being clear and concise. Apart from the engine itself, all other components and accessories are fully dealt with in separate chapters, and there is also given much useful advice on the preparation of vehicles for the road and their management while in commission. The need for frequent "shed days" is emphasized and the writer provides some valuable hints on overhauling and washing out, as well as minor repairs that the driver can undertake in the garage.

The book contains close to 200 5½ x 8-inch pages and is illustrated with numerous simple diagrams and some halftone cuts. It is well indexed.

A. C. Arc Welding and Cutting

A New System Involving the Use of a Novel Principle—No Running Machinery Required and Current Consumption Low

ELECTRIC arc welding, cutting and repairing are accomplished by the application of the heat produced when the electric current jumps a gap in a circuit. The temperature and amount of the heat generated at the arc can be varied to suit the melting point of nearly all metals by varying the electrical characteristic of the apparatus employed to hold the arc.

Arc welding apparatus marketed in the past employed direct current at the arc, which in the case of either an a.c. or d.c. power supply required a heavy motor generator set and an elaborate switchboard. For general welding a 10 to 15 hp. motor and an 8 to 10 kw. generator, with switchboards for both, were required, together with starting apparatus, the whole set weighing from 1 to 2 tons, and for cutting, 2 tons and upward.

The Electric Arc Cutting & Welding Co., Newark, N. J., claims to have solved the problem of holding and controlling an alternating current arc, and it has placed on the market a light weight a.c. welding machine consisting of a special transformer with no moving parts.

It is a law that the heat produced by an electric arc is proportional to the product of the volts across the arc and the amperes flowing through it, or to the wattage, and this wattage must be varied to suit different conditions of metals, electrodes and work. It is claimed for the alternating current arc machine that it automatically holds the heat of the arc substantially constant for any given setting. As soon as a person becomes accustomed to the sound and sight of the arc and can deposit the molten metal where he desires, it is said to be impossible to burn the metal from too much heat, or to make imperfectly joined, or "cold shot" welds, from too little heat. Different metals, electrodes and conditions in shops require various amounts of heat and varying temperatures, and these adjustments are obtained by an easily moved adjustment handle on the special transformer, together with taps arranged on the plugging board, the operation being similar to that of inserting a plug in a telephone switchboard.

The transformer develops an efficiency of between 80 and 90 per cent, considered as a piece of electrical apparatus. From 1½ to 2¼ kw.-hr. are required to deposit a pound of mild steel. A feature of the machine is its portability. In the largest 60 cycle type, the machine weighs about 200 lbs. Means are provided for two men to carry this apparatus to any location, set it up on a bench, or under the bench, or in any position relatively remote from the work.

Can Be Operated from Any A. C. Circuit

The machine can be designed to operate from any-power supply. Any alternating voltage can be made use of, except that for the sake of safety it is not advisable to introduce in the shop any machine taking more than 650 volts in the primary. This lowering of the shop voltage is regular practice. The machine can be designed for single-phase, two-phase three wire, and two-phase four wire circuits, or to operate across the outside wires of a two-phase system or from a three-phase power supply. The polyphase machine is 30 per cent heavier than the single-phase machine; for welding, a power demand of from 3 to 4½ kw. is made with the polyphase machine, and for cutting, from 6 to 8 kw. There is, however, no necessity for buying a polyphase machine, which is heavier and costs more. In the case of two-phase circuits, absolutely balanced current can be drawn from each of the two phases by placing the single-phase machine across the outside wires.

The amount of copper required for the installation of this welder and cutter is comparatively small. The distribution wiring is on the high-voltage side and requires only wires of nominal size. For instance, for a 400-volt shop, two No. 8 wires are sufficient to reach any welding location, and a simple plugging-in arrangement is used.

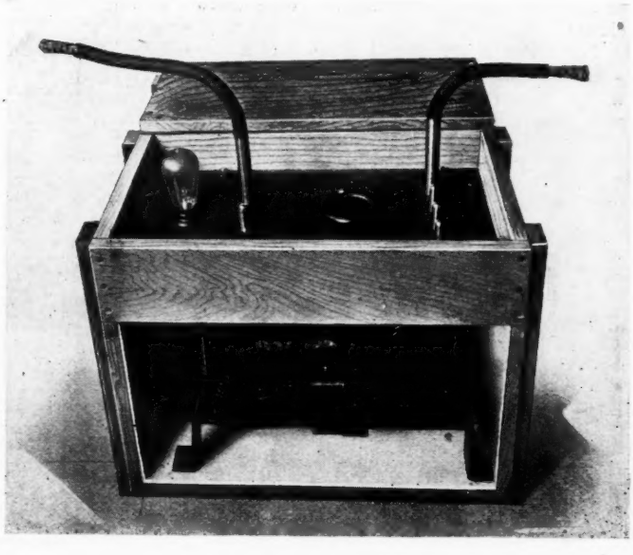
As regards penetrative ability, it is significant that the advent of the a.c. arc has resulted in the practical cutting of cast iron. This has always been considered an impossibility or at least impractical with other systems of cutting, as a layer of cementite would form between the weld and the original cast iron, which had a very low strength and was so hard that machining was impossible. The a.c. arc, owing to its penetration, causes a molecular penetration of from ¼ to ⅜ in. into the cast iron, distributing the weld and the cast iron so that there is no definite hard layer, except for the very outer edges, which can be ground off.

Quality of the Weld

With certain electrodes it is possible to get ductility and elongation. While these qualities are not present to the same degree as in boiler plates, the ductility and elongation of mild steel can be equalled. With boiler plates test pieces can be welded which bend flat on themselves, the bend being in the weld, and which in the twisting test will twist two complete revolutions before tearing.

The machine can be made for either cutting or welding or both functions can be combined in one machine. It can be designed to use any make of electrode—bare wire, slag covered electrodes, gaseous fluxed electrodes, or carbon electrodes.

Among the uses to which the machine can be put are various operations in automobile construction and repair. An example of its use in automobile construction is the welding of the complete rear axle housing together with the axle tubes, these parts being put together without the use of rivets. A repair job to which the machine is applicable is the welding up of a cracked cylinder, and this should be done without stopping the engine running. The water up to the line of the leak is required to distribute local heat strains in welding, and this water should preferably be hot, so that the temperature difference between the arc and the water will not be so great, hence the advisability of keeping the engine running.



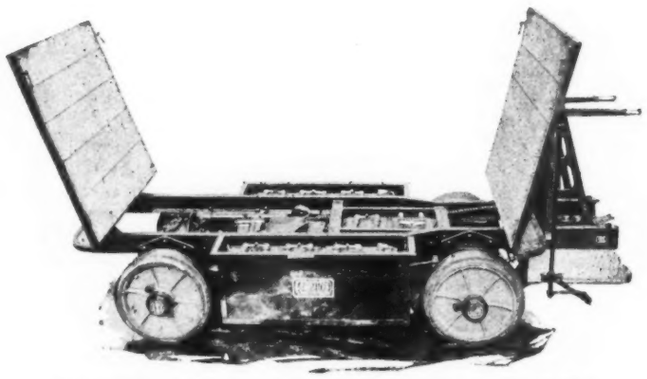
A. C. arc welder

Karry-Lode Industrial Trucks, Tractors and Trailers

Built to S. A. E. Standards Throughout—Employ Roller Pinion Type Internal Gear Drive and Are Provided with an Automatic Safety Switch

THE Karry-Lode Industrial Truck Co., Long Island City, N. Y., has placed on the market a line of industrial trucks, tractors and trailers of the electric type for use on steamship piers, in railway yards and in industrial plants. Their line comprises one size of tractor developing a drawbar pull of 600 lb.; two platform trucks, one with a 60-in. wheelbase and 96 x 45-in. loading platform, and the other with an 80-in. wheelbase and a 116 x 45-in. loading platform; also a compensation crane truck, with a crane fitting into the standard freight car and having 180-degree swing, and a steel trailer with a 36 x 72-in. platform.

Before the design of the Karry-Lode line of industrial trucks and tractors was taken up, a thorough study was made of all machines of this type on the market at that time. Special attention was given to the requirements of strength, flexibility, simplicity, accessibility and reliability. The electric motor used on all models is of 3½ hp. capacity and is of a type specially designed for industrial trucks. It forms a unit with the entire electrical system, which makes for convenience in repair and overhauling. The frame is built up of 4-in. channel beam, the side members being securely tied together by cross members of ample section and reinforced by gusset plates. The battery box is so arranged that every cell of the battery is instantly accessible. The batteries are placed below the loading platform, where they are out of sight.



Platform of truck swung back showing accessibility of battery

Rear Axle of Internal Gear Type

The rear axle is of the internal gear type, the load being carried on a 2¾-in. dead axle made of Shelby seamless tubing. The driving shafts are of solid nickel steel, and the wheels run on large sized Hyatt roller bearings. The front axle is also of tubular design and is provided with drop forged, heat treated steering knuckles. The wheels run on Hyatt roller bearings. Large sized steering connections are used throughout, and the joints are bushed so as to make it an easy matter to take up wear. Cast steel wheels are used, and the internal spur gear drive on the rear wheels is completely inclosed.

The Type P industrial truck has a capacity of 2 tons and a chassis weight of approximately 2200 lb. It is provided with a battery equipment of eighteen 11-plate Ironclad Exide cells, the battery alone weighing 800 lb. The motor operates at 30 volts and consumes a full load current at 40 amp. By means of the controller, three forward speeds and an equal number of reverse speeds are obtainable. The tread is 34 in. and 20-in. steel wheels are used with 3½-in. solid rubber tires.

An external contracting brake acts on the propeller shaft. The frame is suspended on coil springs both in the front and rear. A speed range of from 1 to 7 m.p.h. is afforded and the rated mileage on level surface is 25 miles on one charge. The overall dimensions of this truck are 52½ in. in width, 116 in. in length and 43½ in. platform height.

There are no great differences from the above in the design of the type PL truck, which has a 116 x 45 in. loading platform and the same capacity as the Type P, namely, 2 ton. The chassis weight is 2450 lb. and it carries 20 cells instead of 18, the battery weight being 1000 lb. This machine has a wheelbase of 80 in., and its overall dimensions are as follows: Width, 52½ in.; length, 136 in.; platform height, 23½ in.

The battery and motor equipment of the tractor corresponds to that of the lighter of the two trucks. However, in order to make as much of the weight of the tractor as possible available for traction purposes, it is designed with three wheels, and most of the load of the battery is carried on the rear wheels. The total weight of the tractor is 2500 lb. and its wheelbase is 41 in. The tractor has a rated speed of 1 to 6 m.p.h. and a rated mileage on the level of 25 miles. Its overall dimensions are: Width, 48 in.; length, 69½ in. Its drawbar pull is 600 lb.

A double reduction is obtained from the armature shaft to the rear wheels by a pair of bevel gears at the center of the rear axle and the internal gears and pinions at the wheels. The pinions meshing with the internal gears are of the roller type. They are located directly above the stationary load carrying axle. A Thermoid fabric universal joint is inserted between the electric motor and the propeller shaft and the Bailey non-skid differential is fitted. As a safety device there is a switch which is operated by the driver's seat or footboard and in case the driver should be accidentally thrown from the truck, the latter would

Karry-Lode industrial tractor and truck

automatically come to a stop. Further, if the driver gets into the truck again, he will have to start it over in the usual way by first going into the low speed and passing through the intermediate into the high. It would be injurious to the battery, and to the motor as well, if the controller remained in the high speed position and the current was switched on by the automatic switch. The entire control is effected by means of two levers extending forward from a pair of pedestals secured to the frame side members. The driver stands on the front platform and controls the truck with his two hands, steering by moving one lever in a horizontal plane and starting, varying the speed and braking by moving the other lever in a vertical plane. Motors and controller are of General Electric make.

A view of the trailer chassis is shown herewith. It is of the four-wheel type, having two caster wheels at the forward end and two cast steel wheels on the axle stubs at the rear end.

The frame itself is made of angle steel, reinforced by gusset plates at the corners, and sockets for stakes are riveted to the inside of the frame members. The trailers can be very quickly hooked together, and unhooked, and in some places women have been employed for this work. Women are also used for driving the trucks and tractors.

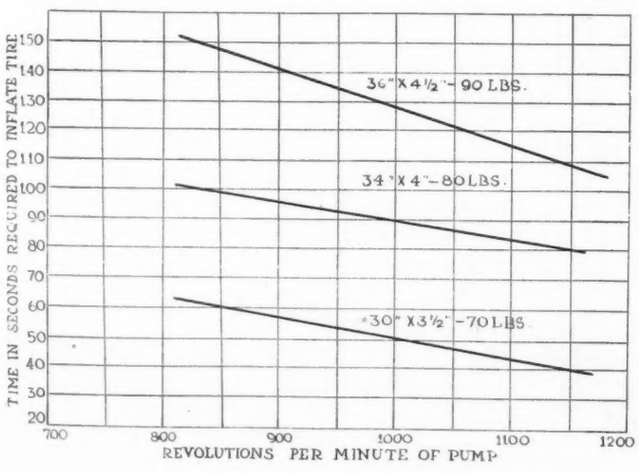
Karry-Lode trailer with platform and stakes removed

Official Test of Tire Pumps

A TEST has been made at the testing laboratory of the Automobile Club of America, New York, of the Cassco power tire pump, manufactured by the West Side Foundry Co., Troy, N. Y., and sold by the Edward A. Cassidy Co., New York City. The test bore mainly on the time required for inflating different sized tires to certain definite pressures, and on the power required for operating the pump.

The Cassco pump has a single cylinder. Cylinder and crank case are of cast iron. The three pumps which were tested were provided with a single piston ring of cast iron. The cylinder and crank case are in two parts with a fiber gasket placed between them. The valves were of the poppet type. During the test the pumps were lubricated with 300 W transmission oil. The pumps were 2½ in. bore and had a stroke of 15/16 in.

In the test the gear and gear shaft were dispensed with. The crank shaft of the pump was directly connected to an electric dynamometer operating as a motor by means of a flexible coupling. A piece of ¼-in. copper tubing, approximately 10 ft. long, was connected between the discharge valve of the pump and an Ashcroft test gage. A three way cock was placed between the end of the tubing and the gage. A piece of rubber tubing 24 in. long was placed between the gage and the Schrader tire air inlet. The valve portion of the Schrader tire valve was removed from the metal inlet, in order to allow the full air pressure in the tire to be recorded in the gage. This necessitated the pump not only filling the tire to the required pressure but also filling the hose and large gage to the same pressure, therefore giving the pressure in the tire as shown on the gage less than what the pump actually delivered. To overcome the pulsation of the air in the gage a stopcock which was kept partially closed was placed between the main air line and the gage. As a result the gage needle did not vibrate and a more accurate reading could be obtained.



Time required to inflate tires

The pressure to which the tires were inflated was 20 pounds per inch of cross-section. The speed of the pump was determined by a Veeder odometer counter and the time by a split second stop watch. The results of the test are recorded graphically in the curve sheet. The manufacturer guarantees that the pumps used in the test were taken from stock and no changes were made in their construction, except that the top of the outlet valve was shortened 1/16 of an inch on all three pumps.

The results indicate that a Cassco tire pump operated under the conditions mentioned above will be able to inflate a 30 x 3½ tire in from 43 seconds to 1 minute and 3 seconds, according to the speed at which it is driven between the limits of 823 and 1138 r.p.m. A 34 x 4 tire will require 1 minute and 20 seconds to 1 minute and 41 seconds between the speed limits of 821 and 1152 revolutions per minute. The inflation time of the third tire (36 x 4½) varied between 1 minute and 45 seconds to 2 minutes and 30 seconds when running the pump between speeds of 828 and 1165 revolutions per minute.

Horsepower determinations were made while inflating a 30 x 3½ inch tire and the power consumption was found to be 0.20 hp. at 800 r.p.m.; 0.27 hp. at 900 r.p.m.; 0.35 hp. at 1000 r.p.m. and 0.44 hp. at 1100 r.p.m. It is stated, however, that no great degree of accuracy can be claimed for these figures, as the power consumed is so small in comparison with the size of the dynamometer.

Canadian Registrations

AS illustrating the ratio of increase in the registration of motor vehicles of all kinds in Ontario, the past year shows a total of 83,799 passenger and commercial cars as against 54,375 in the previous year, an increase for the 12 mos. of more than 50 per cent.

Motor cars were first licensed in Ontario in 1903, when 220 vehicles were registered. Up to and including 1917, the registration advanced to 83,799 vehicles, and Canadians prominent in automobile affairs say that despite the war and its burden the close of the present year will see the 100,000 total far exceeded. In 1903 when motor cars were first licensed in Ontario, not one was owned by a farmer. To-day the farmer car owners of Ontario number 23,409.

AUTOMOTIVE INDUSTRIES
The Automobile

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Super-Induction and Variable Pitch Propellers

VARIOUS suggestions have been made to overcome the effect of the loss of power of an aircraft engine at high altitudes, especially on the lift of the machine. It is mainly to secure a means of counteracting this effect that the Aircraft Board is looking for a variable pitch propeller. The production of such a propeller obviously involves serious mechanical difficulties, and it is doubtful whether these could be eliminated during the period of war.

What is desired chiefly in high altitudes is increased lift. The drift or propulsive effort in the direction of flight, of course, is reduced in the same proportion, but inasmuch as the air resistance also decreases with the density of the atmosphere this does not affect the speed of the plane.

It has been suggested that the loss of lift with increase in altitude could be overcome by using super-induction, employing perhaps an automatic arrangement whereby the pressure at the carbureter inlet could be maintained substantially constant. This alone, however, would not solve the problem, for if the propeller were designed to absorb the maximum power of the engine at the speed corresponding to that power and when operating in air at normal atmospheric density, at an altitude of 20,000 ft., where the atmospheric pressure is down about 50 per cent, it would absorb only 50 per cent of the engine power. The result would be that the engine would increase in speed until its power output would equal the increasing power absorption of the propeller. Inasmuch as the power absorption of a propeller varies as the cube of its speed, there would not be such a very great difference between engine speed near the earth and engine speed at 20,000 ft. altitude. But if the engine and propeller are to be operated near their maximum safe speed in low altitudes, for the sake of maximum plane speed this increase in engine speed of high altitudes is not permissible.

Consequently super-induction will not obviate the need for a variable pitch propeller, but combined with such a propeller it promises to give results in respect to plane speed and lift at high altitudes which are not obtainable with present constructions.

Some Things That Have Hurt

WITHIN the recollection even of some of the newcomers into the ranks of the automobile industry there was staged with much pseudo-pomp and more press-agenting at a national show in Grand Central Palace, New York, a champagne-christening of a highly colored and gaudily decorated representative model of a new make of automobile. This display of bad taste and worse business judgment did not, of course, indicate, except by contrast, the standards of the more substantial and conservative portion of the industry. But it affected every one in the industry to an extent which it is hard to measure.

It was, it is true, an exceptionally aggravated case of misconceived and badly directed advertising effort; but, unfortunately, it was not so much of an exception or so radically different from the general selling methods of the day as it might well have been. And it can also be truly said that in a milder form and in varying extent this same disease has been more or less prevalent among us from year to year.

At all recent shows we have seen too much of the nickel-plated chassis trimmed with satin ribbons, and the silver-plated car with black and yellow striped upholstery made, according to the exhibiting company's ambitious publicity manager, to the special order of some well-known moving picture star or the wasteful daughter of a thrifty millionaire not long deceased.

We have had too many "society days," with their doubled prices of admission and their resulting columns of newspaper comment on the attendance and purchase of cars by those whose chief claim to fame lies in the fact that their names are to be found in the social register.

Our show decorations have been too elaborate. There has been too much of the theatrical in our show methods and show advertising. The automobile industry is paying for it all now.

We thought it was good salesmanship, modern merchandising and, to be perfectly fair, if the world had not gone to war we should probably still think so. It has developed, however, that many of these things, of which we all approved at the time, have actually worked an injury upon us which, when the real merits of the automobile are considered, is wholly undeserved.

There is evidence to be had from many sources that our future shows are to be very different in certain ways from those of past years. It has been suggested that we start to reform by calling them expositions, which they are, instead of shows, which they are not. It is a good beginning. Let us modify our decorative schemes. Let us exclude the gaudy, freakish cars and exhibit the chassis as they are in real life. Let us make our expositions business shows, and emphasize utility and practical value without slopping over in trying to do so. We can't fix up the past—it has many times been given up as a hopeless job—but we can build on more solid ground as we build for the future.

Lessons Learned from a 100-Hour Tractor Test

ONE of the most interesting and instructive features of the attempted 100-hour non-stop test of the Parrett tractor at Salina, Kan., was the demonstration which it afforded of the feasibility of night plowing. Equipped with two powerful acetylene headlights, the tractor worked at night with the same ease as in the day. A great deal of interest was manifested in this night work and it is to be regretted that the official report does not contain a special record of the fuel consumption as compared with that of the daylight operation. It would also be instructive to compare the plowing speed at night with the daytime speed.

The ability to work at night is one of the most valuable features of the tractor. It not only increases the farmer's working day but enables him, in certain localities when the heat of mid-day is oppressive, to do his plowing at a time when both he and the machine can work more efficiently.

It seems likely that when the next tractor demonstration takes place, there will be many non-engine-stop plowing tests. They seem to be more convincing to the farmer than any other sort of demonstration. Many dealers handling tractors have been asked by farmer prospective purchasers to give them a 10-hour continuous plowing demonstration. They are apparently convinced that if the tractor will work successfully during so long a period it will meet all of their requirements.

The test of the Parrett tractor would have been made more valuable if those conducting it had taken account of the kerosense consumption during the 13 hours and 28 min. when the engine was running idle at 360 r.p.m.

The average of 2.4 m.p.h. for 80 hours made by the Parrett tractor in the test is quite remarkable, but even this does not, in all probability, represent what the average performance is likely to be soon.

It seems reasonable to expect that speeds of from 3 to 3½ m.p.h. for similar periods will be demonstrated within the next year. Speeds as high as this were made with good economy and good plowing in the fuel economy test which formed a part of the demonstrations at Salina.

Everything seems to indicate that with redesigned plows, it will be possible to do as good or better work at double and perhaps three times the speed with tractors as is now done with horses.

Motor-Propelled Cultivators

PRACTICALLY none of our present agricultural tractors are adapted for operating cultivators for cultivating corn and similar crops. As cultivation is of equal importance to plowing, and as a farmer cannot dispense with his horses unless he can cultivate as well as plow with his tractor, it is rather remarkable that no more attention has been paid to the motor cultivator. In one respect there is more need for substituting motor power for horse power in cultivating than in plowing, because most of the former has to be done in midsummer when horses suffer greatly from the heat.

Probably the proneness of people to follow the path of least resistance furnishes the explanation why so many engineers have developed plowing tractors and so few motor cultivators, for the design of a practical cultivator involves some decidedly knotty problems. The tractor must afford sufficient ground clearance midway between its wheels so as to be able to straddle the row without injuring it at the last plowing. As the cultivator requires comparatively little draft, the tractor must be made light, else more power will be required to move the tractor itself than to pull the cultivator, and the efficiency will be low. Where so little power is required it seems hardly warranted to employ four cylinders in the engine, but with a smaller number it is difficult to secure a tolerable degree of balance.

In order to prevent covering up the small plants at the first plowing the driver must hold the handles of the cultivator, and therefore must ride behind it. This would point to a two-wheeled tractor with a two-wheeled sulky attached behind as the most logical construction.

In view of the light draft of a cultivator an engine developing about 8 hp. on the brake would seem to be amply powerful. The type of engine most suitable, its arrangement on the frame, the driving connection to the traction wheels and the method of steering still await solution.

□ Latest News of the

Plan Department of Aeronautics

Senator New Introduces Bill Creating Secretary of Aeronautics at $12,000

WASHINGTON, Aug. 2—The establishment of a Department of Aeronautics under the direction of a Cabinet officer, to be known as the Secretary of Aeronautics, is proposed in a bill offered to the Senate by Senator Harry New of Indiana.

The Secretary of Aeronautics would be similar to the Minister for Aeronautics as established in England. He would have authority over all the aircraft activities of the Government, direct and complete control of all matters pertaining to the design, purchase or manufacture of aircraft and aircraft equipment intended for the use of the Army, Navy or Marine Corps. The Cabinet member would be appointed by the President, confirmed by the Senate, and would receive a salary of $12,000 a year.

The introduction of Senator New's bill is the result of the recent agitation for the creation of a department to assume complete control of the aircraft situation. It is reported that both Secretary of War Newton D. Baker and Secretary of the Navy Josephus Daniels are opposed to disturbing the present management of the aircraft problem.

The text of Senator New's bill follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

Section 1. That there is hereby created for the period of the present war, and for one year thereafter, an Executive Department of Aeronautics, the head of which shall be designated the Secretary of Aeronautics, who shall be appointed by the President and confirmed by the Senate. He shall be a member of the Cabinet and shall receive a salary of $12,000 a year. The Secretary of Aeronautics shall have direct and complete control of all matters pertaining to the designing, purchase, manufacture and production of aircraft and aircraft equipment intended for the use of the Army, the Navy and the Marine Corps of the United States.

Section 2. The department shall also have an Assistant Secretary who shall be appointed by the President and confirmed by the Senate, who shall receive a salary of $5,000 a year; and such other officers and employees as may be found necessary for the proper and efficient transaction of the business of the department.

Section 3. The unexpended balance of such appropriations as may have hitherto been made for the purchase and manufacture of aircraft and aircraft equipment and all appropriations which may hereafter be made for such purpose shall be available for the purposes of the department.

In introducing the bill Senator New explained: "I am satisfied that this is the best solution of the aircraft difficulties. It is based upon conclusions reached as a result of 3 months of careful investigation. It is in accord with the opinion expressed by practically all the officers we have examined, as well as the present and former officers of the aircraft management.

"England had to come to it long ago. I do not believe that it will ever be possible to bring about the highest efficiency necessary to the production of the great number of planes we need to win the war as long as there is divided authority, and there is no getting away from the fact that there still is divided authority in the handling of our aircraft program.

"I have become convinced that it is almost impossible to bring two great departments into co-ordination."

The Senate Aircraft Committee has practically completed its investigations. The report will be filed in the Senate shortly after Congress resumes its sessions. Four hundred Liberty engines were produced in July, and it is estimated that 500 will be turned out this month, according to a statement by John D. Ryan. The peak of production, he said, would probably be reached in November or December. Orders have been placed for 50,000 Liberty engines, 27,500 of which will be turned over to the Allied government.

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For Standard Petroleum Specifications

WASHINGTON, Aug. 6—Specifications of petroleum and its products, used by the different departments and bureaus of the Government, will be standardized. The plan is to have standard grades of petroleum and its products for the purpose of avoiding duplication of effort, and for economical reasons.

Standardization will be accomplished by a Committee on Standardization of Petroleum Specifications to be composed of a chairman appointed by the United States Fuel Administrator, a member appointed by the Secretary of War, a member to be appointed by the Secretary of the Navy, a member to be appointed by the chairman of the Shipping Board, a member to be appointed by the Railroad Administration, a member to be appointed by the Bureau of Mines and a member to be appointed by the Bureau of Standards.

The specifications adopted will be binding upon and govern all departments, bureaus, agencies and offices of the Government. The United States Fuel Administrator, acting through the committee, will also effect a standardization of petroleum specifications for the purchases in the United States of the allied governments.

Bar Profiteering in Farm Implements

Makers and Dealers Must Replace Stocks—Take Action to Prevent Hoarding

WASHINGTON, Aug. 6—Manufacturers, wholesalers, retailers or other dealers having a regular stock of farm equipment including tractors or tractor plows and who sell these out at replacement value during rising prices without replacing or intending to replace the stock and sell at replacement values when prices are falling, will be considered profiteers according to a statement made to-day by the Office of Farm Equipment Control of the U. S. Department of Agriculture.

Farm equipment held, contracted for, or arranged for, by manufacturers, wholesalers, retailers or other dealers in excess of the reasonable requirements of the business, for use or sale in a reasonable time will constitute hoarding.

The prices of farm equipment are more or less seasonal, but if the price should rise or fall during the season, then, to be consistent, a person who wishes to sell on the basis of replacement values would be obliged to sell at a loss if the price fell. Equipment carried over from one season to another—that is, the residual from a previous season's reasonable supply—should be considered in the same manner. Therefore, if persons have sold at replacement values, they must continue to do so when a drop in prices comes, and carry the same amount of stock as in the beginning throughout the period of the high prices in order not to profiteer.

In short, says the statement, it will not be considered profiteering if farm equipment is sold on the basis of replacement prices, provided the goods sold are replaced at once at replacement prices and this practice is continued during the period of high prices caused by the war.

It will be considered hoarding if any manufacturer, wholesaler, retailer, or other dealer, holds, contracts for, or arranges for a quantity of farm equipment in excess of the reasonable requirements of his business for sale by him over a reasonable time. Manufacturers, wholesalers, retailers, and other dealers finding themselves inadvertently in this position should sell at cost plus a fair usual profit.

—

Start Hupp Industrial Wagon Production

DETROIT, Aug. 7—The Hupmobile "Industrial Wagon," which will have a rated capacity of 1000 lbs., will be put in production within the next 2 weeks, and it is expected that the vehicles will be ready for the market early in September. The vehicle will be mounted on the standard Hupmobile chassis and the body will be convertible into various types. No price has been decided on.

Automotive Industries

Car Makers Unanimously Agree on 50% Cut in Production

National Automobile Chamber of Commerce Votes to Limit Output to Half That of Last Year—War Industries Board Sub-Committee Appointed

WASHINGTON, Aug. 8.—Eighty members of the National Automobile Chamber of Commerce met in Detroit Tuesday, Aug. 6, and voted unanimously in favor of a 50 per cent curtailment of passenger car manufacture. This means a 50 per cent reduction of the production of last year.

The meeting and the curtailment resolution were the direct result of a conference early in July in Washington between Hugh Chalmers and Alfred Reeves, representing the automobile industries, and the War Industries Board. At that meeting Bernard M. Baruch, chairman of the War Industries Board, suggested that the passenger car makers get together and determine what they thought would be a safe maximum curtailment. Mr. Baruch at that time made mention of a possible 75 per cent cut, but did not stipulate this figure.

In voting for a 50 per cent curtailment manufacturers reached what they believed is the largest cut in production compatible with industrial conditions. They believe that by cutting production 50 per cent, combined with the war work they have taken on, they will just be able to retain their organizations and operate their businesses efficiently to maintain them through the present emergency.

At the last meeting with the War Industries Board Mr. Chalmers pointed out the harmful effect of a considerable curtailment, telling that ruin would be brought to the state of Michigan and other passenger car manufacturing centers if a drastic curtailment were insisted upon.

Mr. Chalmers and Mr. Reeves arrived in Washington to-day and will immediately hold a conference with the War Industries Board.

Mr. Chalmers, Mr. Reeves and Charles C. Hanch of the Automobile Section of the War Industries Board conferred with J. Leonard Replogle and Mr. Baruch and presented to them the resolution together with a pledge from the manufacturers. No further discussion regarding curtailment was undertaken.

A sub-committee of the War Industries Board has been appointed consisting of Alexander Legg, chairman of the Requirements Division; Judge Edwin B. Parker, chief of Priorities; George N. Peek, director of Finished Products, and J. L. Replogle, director of the Steel Section. This committee will confer further with Chalmers with regard to curtailment for the future.

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Car Production Reduced

DETROIT, Aug. 6.—The most marked change in this territory in the passenger car manufacturing field is the gradual reduction of production. As recently reported in AUTOMOTIVE INDUSTRIES, many manufacturers are nearing the 25 per cent line of production—some have already arrived at this figure.

Whether this output will be reduced still further is a matter of conjecture, and manufacturers are very reticent about making any prophecies regarding the future. They will continue production up to the limit of their ability to secure materials, many feeling optimistic about the situation and believing relief of the great strain under which they are laboring is close at hand.

Production of Willys-Overland, Inc., averages 400 daily; that of the Paige is 35; Reo has reduced its production 50 per cent compared with a month ago; it is now 40 cars per day, while the output of the speed wagon is 25 daily; Buick's production is in the neighborhood of 175 daily; Chalmers 50; Harroun is reported at 10; King averages also 10; Liberty produces 7, and Scripps-Booth 40. Ford passenger cars come out at the rate of 350 a day and the trucks at 400. Packard, Hupp, Briscoe and Columbia production figures are the same as reported a month ago,

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Copper Price Set at 26 Cents

WASHINGTON, Aug. 8.—The maximum price of copper will remain 26 cents per lb. until Nov. 1 through an agreement reached to-day between the Price Fixing Committee of the War Industries Board and the copper producers. This price is subject to approval by President Wilson.

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War Profits Tax In Controversy

WASHINGTON, Aug. 7.—A controversy between the Treasury Department and the Ways and Means Committee has developed as to the most effective method of taxing war profits. The Treasury asks for:

A straight tax of 80 per cent on all war profits and as an alternative the excess profits tax left just as it is in the existing law which is from 20 to 60 per cent.

The Ways and Means Committee desires:

An excess profits tax running from 30 to 50 and 80 per cent on the net income of corporations. It is willing to provide as an alternative a war profits tax of 80 per cent so that the Treasury could exercise its option and apply the tax which would produce the most revenue.

Arguments by experts of the Treasury Department failed to move the Ways and Means Committee yesterday. Chairman Kitchin and others of the committee contended that large corporations would not pay a sufficient tax on non-war products and activities if the present excess profits tax is allowed to remain. It was stated that Henry Ford and other large passenger car manufacturers would "get off too easily."

Chairman Kitchin stated that $200,000,000 would be lost by the Treasury plan. The Treasury Department contends that the Ways and Means Committee plans would cost the nation far more by driving out of business those corporations whose profits are only indirectly or not at all due to the war.

The following two examples were given by Mr. Kitchin to show how the two systems would work:

Take a $100,000 corporation which made $6000 before the war and now makes $25,000. Under the Treasury's plan the corporation would be taxed $15,200 while under the existing excess profits rates it would be taxed $4400.

Another $100,000 corporation which made $25,000 before the war and is making $25,000 now would pay nothing under the Treasury's war profits tax and would be taxed only $4400 the same as the other corporation.

In other words the corporation which has for years enjoyed a steady income of $25,000 would pay only $4400 and the other which has a sudden increase due to the war will pay more than $15,000. The committee's schedule of excess profits taxes would compel the second corporation to pay at least $8000 instead of $4400. We would equalize the burden at least to that extent.

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Cleveland Tractor to Be Made in Great Britain

LONDON, July 22—It is announced that the H. G. Burford Company, which formerly sold the Burford truck and has been handling the Cleveland tractor in Great Britain, has secured from the British Government a license to manufacture the Cleveland tractor in that country. It is said that 250 of them are being built and will be ready for delivery in September.

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War Revenue Tax Nets $23,981,000

WASHINGTON, Aug. 7.—Automobile and motorcycle manufacturers and dealers paid into the Treasury Department $23,981,000 under the war revenue bill for the year ended June 30, 1918, according to a statement issued yesterday by the Treasury Department.

June Exports 28% Over May

But Show a Decided Drop from the Figures of a Year Ago

	1918			
	Cars	Value	Tr'ks	Value	Parts
June	3,098	$2,808,463	829	$2,001,488	$3,195,353
May	2,801	2,907,390	866	1,958,603	2,859,496
	1917				
June	7,582	5,712,677	1,245	2,965,254	2,902,862

WASHINGTON, Aug. 5—Exports of passenger cars, trucks and parts during June amounted to $9,904,768. This is a gain of 28 per cent on the figures for May, but represents a loss of 30 per cent when compared with the exports for June, 1917. There is but little difference in the number of passenger cars shipped as between May and June, 1918, the totals being 2801 and 3098 respectively, whereas in June, 1917, 7582 cars were exported. The month's car exports of a year ago were valued at more than double the amount for June, 1918.

Commercial car exports for June show a slight decrease in number as compared with May, although their value is slightly higher. In June, 1917, when 1245 trucks, valued at $2,965,254, were exported both number and value were approximately 50 per cent higher than during the same month this year.

The fact that only one airplane was exported during June indicates very clearly that planes for military use are not included in the published export figures. Airplane parts show a big increase from the figure of $771,673 in May to $1,609,503 in June, 1918. The total for June, 1917, was $501,473 and the complete total for the twelve months ending June, 1918, was $8,446,077 as against $3,133,903 for the previous year.

Canada continues as the leading buyer of passenger cars and it is of interest to observe the relatively big figures representing Chile's purchases which tend to indicate that full use is being made of the return trips of nitrate ships to that country. France and the United Kingdom are the leading buyers of commercial cars, although Canada is a steady customer. The year's figures covering the export of tractor and creeper type engines show a great increase in comparison with the 1917 totals.

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Coal Committee Postpones Trip

DETROIT, Aug. 1—Due to Fuel Administrator Garfield's absence from Washington at this time the delegation of business men that was to see him regarding Detroit's supply of anthracite has been postponed for 2 weeks. The primary object of this committee is to lay before the fuel administrator the true condition of the fuel situation in Detroit with a plea that more anthracite be sent here. Unless more coal can be secured for this territory a great many Detroit homes of workers will be heatless this winter, which would probably result in a shortage of workmen.

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Patent Rights for Bevel-Edge Granted

DETROIT, Aug. 5—Joseph H. Bourgon, body engineer of the Studebaker Corp., was granted patent rights covering the use of a bevel-edge around the top of an automobile. The bevel-edge is one of the most outstanding features of the new series 19 Studebaker.

Tractors Are Wanted in Mexico

250 Imported Recently; More Wanted—Government Is Paying for Them

LAREDO, TEX., Aug. 3—Information in regard to the revival of various lines of industry in Mexico is brought here by C. J. Boothroyd, general agent of the Constitutionalist Railways of Mexico, formerly called the National Railways of Mexico. Mr. Boothroyd makes his headquarters in the City of Mexico and has recently traveled extensively over that country. He says that special efforts are being directed by the Carranza government toward introducing modern American methods of agriculture upon the larger plantations.

One of the important steps in this direction has been the recent importation of 250 farm tractors from the United States. These tractors have been distributed among farmers of different sections and are now employed in breaking land and in other farm operations. The cost of these machines was borne by the government.

More than 100 additional tractors have been ordered and will likewise be distributed among the more progressive plantation owners as soon as they are received in this country. It is claimed that special advantages are offered for the use of tractors in agricultural work in Mexico on account of the large size of most of the cultivated tracts of land. In the Laguna district around Torreon, where an average annual yield of about

Exports of Automotive Equipment for June and Twelve Previous Months

	Month of June				Twelve Months Ending June, 1918			
	1918		1917		1918		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes	1	$3,500	78	$450,895	20	$206,420	135	$1,001,542
Airplane parts	.....	1,609,503	.....	501,473	.....	8,446,077	.....	3,133,903
Commercial cars	829	2,001,488	1,245	2,965,254	12,199	31,845,828	15,977	42,343,502
Motorcycles	176	286,461	1,693	357,617	10,746	2,373,396	16,609	3,404,716
Passenger cars	3,098	2,808,463	7,582	5,712,677	52,308	45,327,671	64,808	48,612,632
Parts, not including engines and tires	.....	3,195,353	.....	2,902,862	.....	32,933,006	.....	27,420,913
Total	.....	$9,904,768	.....	$12,890,778	.....	$121,132,398	.....	$125,917,208
ENGINES								
Automobile gas	2,374	$253,894	1,908	$236,167	35,846	$4,134,142	23,375	$2,817,921
Marine gas	240	139,029	1,456	257,499	7,223	2,596,166	7,815	2,208,114
Stationary gas	1,912	206,341	3,322	452,581	27,475	3,121,532	32,002	3,319,393
Tractor and creeper type gas	1,189	1,528,658	1,175	1,719,007	23,306	23,665,323	7,985	10,540,639
Total Engines	.....	$2,127,922	.....	$2,665,254	.....	$33,517,163	.....	$18,886,067

EXPORT BY COUNTRIES JUNE, 1918

	Passenger Cars		Trucks		Passenger Cars		Trucks	
Argentina	233	$275,211	.....	.....	3,525	$2,666,898	.....	.....
Australia	304	260,275	.....	.....	4,307	3,410,557	.....	.....
British India	14	13,450	.....	.....	73	53,428	.....	.....
British South Africa	224	183,654	.....	.....	2,142	1,700,136	.....	.....
Canada	478	435,522	107	134,137	12,981	10,186,170	1,108	$1,381,542
Chile	299	362,054	.....	.....	3,399	3,576,571	.....	.....
Cuba	177	210,642	.....	.....	2,961	3,029,813	.....	.....
Denmark	.....	.....	.....	.....	2	4,100	.....	.....
Dutch East Indies	.....	.....	.....	.....	73	53,428	.....	.....
France	185	98,331	261	945,726	1,169	1,518,858	2,754	10,001,626
New Zealand	.....	.....	.....	.....	1,682	1,342,720	.....	.....
Norway	5	18,444	.....	.....	97	115,810	.....	.....
Philippine Islands	55	33,932	.....	.....	1,714	1,373,204	.....	.....
Russia in Europe	.....	.....	.....	.....	492	1,136,400	406	1,562,303
Russia in Asia	.....	.....	.....	.....	5	8,425	.....	.....
United Kingdom	.....	.....	205	456,757	892	1,929,677	5,202	14,642,309
Other Countries	988	788,357	256	464,868	15,459	11,855,573	2,679	4,258,048
Totals	2,962	$2,679,872	829	$2,001,488	50,973	$43,961,768	12,149	$31,845,828

100,000 bales of cotton is obtained, tractors have been in use for several years upon some of the plantations. They have proved highly successful.

Before Germany began the present war, practically all of the farm machinery and equipment, including tractors, in use in Mexico came from that country. This was due almost altogether to the fact that the hardware and farm implement and machinery business of Mexico was in the control of Germans. In nearly every town and city of any consequence in the country there were establishments of this kind owned by Germans. They patronized manufacturers in Germany exclusively and as a result nearly all of the farm implements and machinery up to the beginning of the war were of a German pattern.

There promises to be a rapid and large development of this character of trade with the United States. One cause is that German dealers in Mexico have been placed upon the black list by the American government under the Trading With the Enemy Act. All trade relations, of course, with Germany have been cut off, and now that they are unable to obtain stocks from the United States they are practically excluded from further doing business. Many new firms have entered the hardware and farm implement and machinery business in Mexico during the last several months. In most instances they are composed of either Americans or Mexicans. The new concerns are showing a progressive spirit in the matter of building up business, and it is believed that the Germans will find it difficult to recover the trade which they have already lost in Mexico.

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More Return Loads Bureaus for New England

PROVIDENCE, R. I., Aug. 3—Plans for a system of Return Loads Bureaus throughout New England were further advanced following a meeting held here on Thursday, which was attended by representatives from all the states in this group. F. W. Aldrich, who is chairman of the Rhode Island Commercial Economy Board, presided. Stoughton Bell, representing the Boston Chamber of Commerce, reported that his organization had decided to inaugurate a bureau, following the report of a committee which investigated and favored the plan. He stated that $4,000 has been pledged to carry the work along for 6 months, after which it may be self-supporting or nearly so from fees received from those utilizing the bureau. Massachusetts state officials are in hearty co-operation with the plan, and the committee on Public Safety has pledged $1,500 toward the expenses of the bureau, and has placed at its disposal all the facts and figures gathered by Francis Hurtubis, Jr., chairman of its motor car and truck division, on vehicles and highways in the state following a 6 months' investigation. The Chamber of Commerce will put up $1,000 and the motor truck dealers have pledged another $1,000. The remaining $500 has been raised from teaming and manufacturing interests.

Another Increase in Gasoline Output

More Than 10 Million Gal. a Day Produced During May—Crude Output Also Greater

Production

	May, 1918	April, 1918
Crude oil (bbl.)	28,510,698	26,201,554
Gasoline (gal.)	319,391,202	293,396,160

Stocks on Hand

	May 31, 1918	April 30, 1918
Crude oil (bbl.)	11,824,633	12,600,062
Oils purchased to be re-run (bbl.)	872,300	954,205
Gasoline (gal.)	460,637,479	509,197,134
Kerosene (gal.)	343,311,945	393,527,476
Gas and fuel (gal.)	515,020,224	471,644,479
Lube (gal.)	161,009,729	144,383,212
Wax (lb.)	168,178,328	151,228,317
Coke (ton)	15,583	13,109
Asphalt (ton)	104,214	101,328
Miscellaneous (gal.)	317,115,697	248,260,551

WASHINGTON, Aug. 5 — During May, 1918, the average daily production of gasoline was 10,302,942 gal., which was an increase of 523,070 gal. per day over the production of April. The total production for the month of May was 319,391,202 gal.

The stock of gasoline on hand, according to figures just issued by the Bureau of Mines, was, on the last day of May, 1918, 460,637,479 gal., which is less than was on hand on April 30, the figures for the latter date being 509,197,134 gal.

The production of crude oil in May totalled 28,510,698 bbls. for the month, which gives a daily average of 919,700 bbls. The stock of crude on hand on May 31 was 11,824,633 bbls. as against 12,600,062 bbls. for April 30.

The accompanying tables show the production of crude oil and gasoline for May as compared with April, and the stocks on hand of crude oil and its derivatives as of the last day of each of these two months.

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Export Regulations Modified

WASHINGTON, Aug. 2—A simplified procedure has been adopted for exports to the United Kingdom, France, Italy or Belgium, excluding their colonies, possessions and protectorates, and for goods destined to any colony by way of these countries excepting shipments to Switzerland by way of France or Italy.

After Aug. 12, 1918, applications for licenses to export any commodity to the above named countries will be refused if the applicant subsequent to that date and prior to the issuance of the license applied for shall purchase or otherwise acquire or commence to manufacture or produce or fit the articles specified in the application for the fulfillment of a specific export order. New forms have been devised by the War Trade Board, which will be given to shippers upon application to meet the new rulings. Applications for licenses to export to France must have attached thereto a copy of the French Government Attestation. Applications filled in the proper forms and mailed to the War Trade Board will be referred by the board to the war mission of the allied country for which the shipment is intended. Export licenses under the new procedure will be valid 90 days, with extensions allowed for unusual cases.

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The Government's Purchases of Motorcycles and Trucks

WASHINGTON, Aug. 2 — Twenty-seven thousand and five motorcycles and 25,874 side cars for motorcycles were purchased by the Motor Transport Service of the Quartermaster Corps from April 8, 1917, to July 1, 1918. This includes all the purchases made by the original Motor Transport Section which was under Brig.-Gen. Chauncy D. Baker and Christian Girl. During the same period 8809 motor truck ambulances were purchased.

On July 1 reports showed 4308 motor trucks of less than 1-ton capacity, 5703 1½-ton trucks, 7987 3 to 5-ton trucks and 3420 passenger cars overseas.

Prospective deliveries of motor trucks for July were 4797, for August 4355 and for September 4448.

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Supplementary Priorities Issued

WASHINGTON, Aug. 1—Supplementary to the recently announced priorit regulations, the War Industries Board has given class B-4 priority to the maintenance of jobbers stocks of plates, sheets, bars, shapes, tubular products, wire and wire products, heavy hardware, farm implements, oil well supplies and similar products.

Class A-6 priority has been allowed for the operation and maintenance (not new construction expansion or replacement) of coke oven plants, smelters, furnaces, rolling mills, wire drawing mills, pipe and tool mills employed in the production of fuels, metals and metal products.

Class C priority has been allowed for materials, equipment or supplies for the maintenance of existing equipment, for the supply of light, heat, power and sanitation; the necessary supplies and essential repairs (not expansions or replacements) to existing buildings and manufacturing plants; the operation of machine shops and blacksmith shops; nails, screws, bolts and nuts used for any purpose.

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For Fixed Price Contracts

WASHINGTON, Aug. 3.—Fixed price contracts will be used hereafter whenever possible in the purchase of supplies for the War Department. In exceptional cases, only where it is clearly to the advantage of the Government, a cost plus contract will be used. This will be a cost plus fixed compensation rather than a cost plus percentage contract. These decisions were made to-day by the Superior Board of Review of the General Staff. Decisions on contracts will not be left to individuals. All cost plus contracts will first be reviewed and approved by the particular supply bureau's board of review and must first be approved by the Superior Board of Review.

Francis E. Stanley Is Dead

Steam Car Pioneer Succumbs to Injuries Received in Automobile Accident

NEWTON, MASS., Aug. 1—Francis E. Stanley, one of the Stanley brothers of Newton, Mass., famous pioneers of the carriage industry, died as a result of an automobile accident near Ipswich, Mass., on July 31. Mr. Stanley was returning from a trip through Maine, and was in the car alone at the time.

Where the accident occurred the road is hign crowned, and Stanley is reported to have driven at a considerable speed. The car slewed and overturned, and Stanley was pinned beneath it. Help was soon at hand and the injured man was rushed to the hospital at Beverly, but he died on the way.

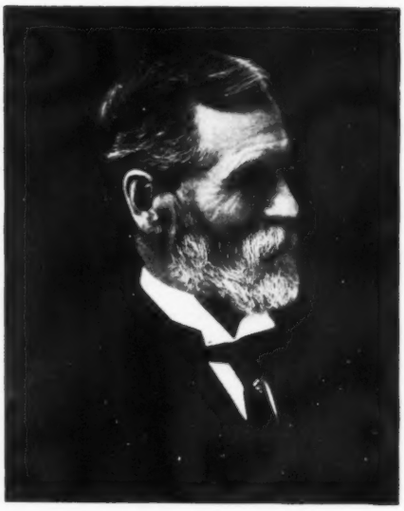
The mention of Stanley's name carries with it memories of the early days of the automobile history. The Stanleys originally came from Maine, having been born (the brothers were twins) in Kingsfield, Franklin County, on June 1, 1849. At one time they lived in Lewiston, Me., where they learned of the works of an early steam vehicle experimenter, E. F. Fields.

During his youth F. E. Stanley worked as a carriage maker, portrait artist and photographer, and later the two brothers engaged in the manufacture of photographic dry plates at Newton, Mass.

Their attention was again directed to automobile development by an exhibition at the Brockton, Mass., fair in the fall of 1896. They set to work to build a steam runabout, and produced a machine light in weight, attractive in appearance, silent in operation and comparatively powerful.

The first machine was sold in August, 1898, and its success induced the Stanley brothers to make plans for manufacturing the vehicle on what was then regarded as a large scale. By the end of the year they had a lot of 100 cars going through the plant, and more than this number had been sold. Some of the major parts were being made by outside concerns, and the work at the Newton plant, which comprised a frame building at which the experimental work had been done, and a machine shop erected during the spring of 1898, was practically limited to their sampling. However, the various parts were all designed by or under the direction of the Stanley brothers, who also supervised the manufacturing operations.

In the spring of 1899 John Brisben Walker, at the time publisher of the Cosmopolitan magazine, and quite a prominent figure in national affairs, purchased from the Stanley brothers the right to their steam car, as well as the plant at Newton, Mass., and secured the services of the Stanleys for a period of one year. The deal, which involved a cash payment of $250,000 to the Stanleys, occasioned much discussion at the time, partly on account of the large sum involved and partly because the Stanleys had as yet no basic patent on their vehicle.



FRANCIS E. STANLEY

Shortly after having acquired the Stanley rights Mr. Walker disposed of a half interest in them to Anzi Lorenzo Barber, an asphalt magnate. For a time Messrs. Walker and Barber managed the business jointly, but later two companies were organized to manufacture the little steamers, the Locomobile Company of America, of which Mr. Barber was president, and the Mobile Company of America, of which Mr. Walker was the head, and both began to manufacture runabouts of substantially identical design, known as the Locomobile and the Mobile respectively.

After their year's contract with the Locomobile company had expired, the Stanley brothers set to work to bring out a car of improved design, and eventually they bought back the factory plant in Newton, which had gone to the Locomobile company in the deal whereby they took over the Stanley business. Although there was a serious slump in the demand for steam cars not long after the Stanleys had started again under their own name, they made a success of their new venture, and the Stanley steamer is still being produced to-day, many improvements in its design having been introduced in the course of time.

About a year ago the Stanley Car Co. was reorganized, and the two brothers retired from its active management. Mr. Stanley is survived by his wife, by a son, Raymond Walker Stanley, now in France, and two daughters, Mrs. Edward M. Hallett and Mrs. Prescott Warren, both of Newton, Mass.

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Indian Office Asks Bids on Passenger Car

WASHINGTON, Aug. 5—Bids are requested by the Indian Office, Washington, D. C., for one 6-cyl. automobile, two-passenger model, complete with top and usual equipment. Proposals for the bids will be received up to Aug. 15, 1918.

Map Route for Tour by Airplane

British and American Officers to Fly Over 14 Cities in Demonstrations

WASHINGTON, Aug. 5—Plans for the aviation tour by American and British aviators, recently announced in AUTOMOTIVE INDUSTRIES, have been completed. Major General William L. Kenly, Director of Military Aeronautics, has placed Major C. I. Rhinehart in command of the party. The guest of honor will be Brig. General C. F. Lee, head of the British Aviation Mission in this country. The party will comprise several American pilots with American planes, and General Lee, accompanied by several British pilots with British planes. The cities and states for the tour are as follows, subject to alteration in event of unfavorable weather conditions:

Cincinnati	Aug. 14
Dayton	Aug. 15
Columbus	Aug. 16
Cleveland	Aug. 17-18
Toledo	Aug. 19
Detroit	Aug. 20-21
Indianapolis	Aug. 22-23
St. Louis	Aug. 24-25
Kansas City	Aug. 26-27
Des Moines	Aug. 28-29
Omaha	Aug. 30-31
Minneapolis and St. Paul	Sept. 1-2-3
Milwaukee	Sept. 4
Chicago	Sept. 5-6

The visits to Des Moines and St. Paul will come at the time of the Iowa and Minnesota State Fairs. The visit to Chicago will come during the Allied War Exposition, which takes place there Sept. 1-15.

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Chandler Profits to June 30, $1,250,000

CLEVELAND, Aug. 5—After making a liberal provision for war taxes, the profits of the Chandler Motor Co. as of June 30 were somewhat in excess of $1,250,000. When the books of the company were closed for the year 1917, the total was $12,400,000. When the books of the company were closed for the year 1918, the total was $12,500,000. The production of passenger cars by the company has fallen off to about the same extent as other big companies.

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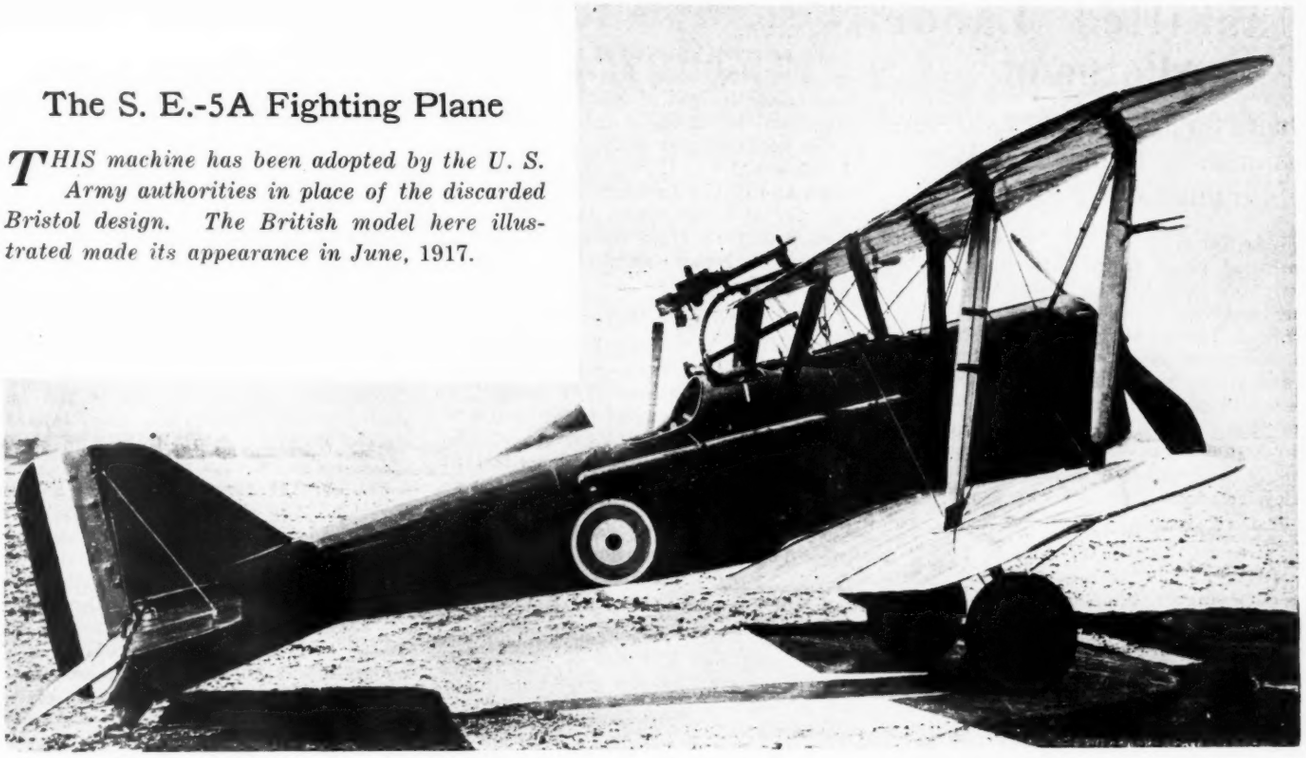
New Building for Accessory Manufacturer

DETROIT, Aug. 3—The Motors Metal Mfg. Co., makers of sheet metal parts for cars, trucks and tractors, is building an addition measuring 65 x 260 to its main factory plant. The company is at present devoting approximately 70 per cent of its output to Government work and is, in addition, manufacturing a line of fenders and streamline hoods for Fords.

The S. E.-5A Fighting Plane

THIS machine has been adopted by the U. S. Army authorities in place of the discarded Bristol design. The British model here illustrated made its appearance in June, 1917.



July Air Mail Service Surpasses June

WASHINGTON, Aug. 6—The July record of the Air Mail Service, as shown in the monthly report of Second Assistant Postmaster General Praeger, surpasses that of June. Of 108 possible flights in July, 98 perfect flights were made, without interruption through forced landings or mechanical troubles. Only two of the 108 trips were cancelled on account of weather, and only eight forced landings were made. Four of the forced landings were by an officer new in the work and the route. The flights during the month covered a total of 11,855 miles.

The best performances made by aviators were in the order following:

Lt. J. C. Edgerton, 18 perfect trips with a total of 2430 miles, without a single interrupted flight.

Lt. Walter Miller, 19 perfect trips with an aggregate of 1710 miles, without a single interruption.

Lt. E. W. Killgore, 16 perfect trips, aggregating 2160 miles, and one interrupted flight and one uncompleted flight.

Lt. H. P. Culver, 14 perfect flights, aggregating 1080 miles, and one interrupted flight.

During the month all mail speed records were broken when on July 29 the mail was carried from Washington to New York in 2 hours and 5 minutes flying time.

Storm flying records were established when Lieuts. Edgerton, Bonsal and Killgore put their machines through driving rain and wind storms that practically shut out visibility, flying entirely by compass and making perfect landings. On the New York-Philadelphia end, several flights were made by Lieuts. Miller, Culver and Webb through fog, haze and rain.

—

Tractor Import Restrictions Modified

LONDON, July 22—It is understood that the Government has agreed, although no official announcement of the fact has been made up to the time of writing, that British importers and dealers in imported tractors may fix the price at which they are sold on a basis of cost plus 33 1/3 per cent. Under the conditions which have governed the importation of tractors into England up to this time the Government has found space on incoming ships for those tractors for which import licenses have been issued, with the understanding that the public selling price of the tractors should be calculated on the net landed cost in England plus 25 per cent. In other words, the selling price includes an available gross profit of 25 per cent to cover the importer and the dealer and all selling expenses. It has been found that this margin is too small, with the result in many cases that tractors have to be handled by dealers at a margin of 7½ per cent gross discount.

The new arrangement will give the importer and dealer a margin to work upon sufficient under existing conditions.

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Federal Control of Oil

WASHINGTON, Aug. 1.—Federal control of the oil industry will probably be announced within the next few weeks, the plan being chiefly designed to eliminate competition and to fix prices. The control will be used, however, in the future, if occasion demands, to keep up the military supplies of this country and the Allies. It is now thought that it will be more or less of a voluntary nature, although the provisions of the Lever bill are available if needed. Competition will be eliminated by fixing prices of crude oil in the various fields and setting a maximum figure on bonuses. It is likely that a series of price differentials will be issued based on the price of crude oil.

Packard and Dodge Salesrooms to Merge

BOSTON, Aug. 5—On September 15 the Packard and the Dodge Brothers motor cars and trucks will be sold under one roof in Boston, bringing about one of the biggest consolidations to cut down overhead in the country. A few weeks ago the announcement was made that they had consolidated at Worcester, and the present announcement will dissipate a lot of gossip about what Alvan T. Fuller intended to do in Boston, which comprised everything from running for governor to abandoning the motor industry all together.

Under the plan, the C. S. Henshaw Co., handling Dodge Brothers cars, will concentrate with the Packard forces in the big Packard building 1079 Commonwealth Avenue. It is not a merger of the two businesses, for each company will keep its working forces intact, with the same executives in charge of each department.

The Henshaw company has had to maintain three buildings to meet the growth of the sale of cars and trucks. Two of these will be vacated, the big salesrooms on Boylston Street, the largest on that thoroughfare, and the service station on Beacon Street. The newly opened service station on Commonwealth Avenue will be retained.

The Packard salesrooms will remain as they are, and the Dodge Brothers cars will be sold in the Easterly wing of the Packard plant where used Packard cars and trucks were sold. This building, rumor had it, was going to be turned over to the Government. The plan of consolidation worked so well at Worcester with these two firms that the Boston plan was the result, and it will save the Henshaw company some $25,000 a year overhead expenses.

Unskilled Labor Allotment

Quota for Each State as Determined by Demand of War Industries Up to Oct. 1

WASHINGTON, Aug. 2—Quotas of unskilled labor to be furnished by the various states to war industries during the next two months were allotted yesterday. Immediate steps will be taken to find more unskilled workers for Government projects during the next few weeks. Following are the quotas allotted the different states. The United States Employment Service in each state will supply the numbers of men mentioned below as called upon for war work:

Alabama	2,070
Arizona	1,350
Arkansas	1,980
California	21,555
Colorado	5,175
Connecticut	8,460
Delaware	855
Florida	2,520
Georgia	3,105
Idaho	11,035
Illinois	40,230
Indiana	10,710
Iowa	5,805
Kansas	5,175
Kentucky	4,140
Louisiana	4,500
Maine	3,915
Maryland	7,335
Massachusetts	30,150
Michigan	12,330
Minnesota	9,405
Mississippi	1,125
Missouri	12,915
Montana	3,060
Nebraska	4,185
Nevada	810
New Hampshire	2,520
New Jersey	24,705
New Mexico	585
New York	86,490
North Carolina	2,205
North Dakota	1,945
Ohio	25,245
Oklahoma	3,870
Oregon	4,410
Pennsylvania	42,570
Rhode Island	4,815
South Carolina	1,440
South Dakota	1,350
Tennessee	3,465
Texas	7,290
Utah	2,115
Vermont	1,575
Virginia	4,590
Washington	11,340
West Virginia	3,870
Wisconsin	8,685
Wyoming	900

The total of the quotas represents the immediate and future unskilled labor requirements of war industries which had filed applications for workers up to July 31. Future needs are figured up to Oct. 1. Many war industries have not yet reported their requirements, but are expected to do so by Aug. 15, following which their needs will be tabulated and supplementary quotas will be issued.

It is now known that 451,000 unskilled workers are needed. It is expected this number will be doubled when the fall requirements are filed.

In the industrial states the present quotas average about 5 per cent of the estimated number of men who are not in military service or already engaged in war work, agriculture, mining or transportation. In Western and Southern agricultural states the average percentage is somewhat higher, as allowance has been made for unfilled farm labor needs.

The primary purpose of the quota system is to protect any state or community from being drained of unskilled labor unfairly and to insure a fair contribution to the needs of war work from all parts of the country. It will operate to the advantage of the farmers of the country who, for the past year, have been the worst sufferers from unregulated independent labor recruiting.

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Teach Packing to Save Space

WASHINGTON, Aug. 3—A school instructing officers and enlisted men in boxing and crating has been opened at Madison, Wis., to utilize cargo space to the best advantage. Instruction will be given to men from all departments that make overseas shipments. The course requires three weeks at the University of Wisconsin and one week in the box factory of two corporations.

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Ben Hur Plant Acquired by Government

CLEVELAND, Aug. 2—The plant of the defunct Ben Hur Co. at Willoughby has been leased by the government for the duration of the war, and the factory is already being placed in readiness for the work. The Ben Hur plant is on a parcel of 8.66 acres, and the factory building is 150 by 400. In addition there is an office building containing 6000 sq. ft. of floor space; also a boiler house.

—

Government Wants Oil Experts

WASHINGTON, Aug. 3—The Bureau of Oil and Natural Gas Conservation, United States Fuel Administration, needs six field inspectors whose work will consist of visiting oil and gas-producing localities to ascertain the condition of wastage of oil and gas. The bureau also desires the services of eight fuel oil combustion engineers. As far as possible, all are desired to volunteer their services to the Government during the period of the war, but if this is not possible, a fair remuneration together with necessary expenses will be paid. Only men having had experience in these respective lines need make application.

Europe Has 522,122 Passenger Cars

Great Britain Leads with 171,607, but Monaco Has Highest Proportion

TURIN, ITALY, July 14—According to figures compiled and recently announced by the Fiat Press Bureau the number of passenger cars in Europe is 522,122, Great Britain leading with 171,607 in 1917. On the list, which is printed below, Germany stands second with 95,000 cars in 1914, which is the last year for which statistics are available. France with 98,400 and Italy with 35,500 are third and fourth respectively.

The returns for Great Britain show a decrease over those for 1914, the numbers used in the compilation being of passenger cars only. During the war period, as is well known, Great Britain has added very materially to the number of commercial vehicles of which she makes use. The number of privately owned motor cars in France before the war was about 115,000. It is estimated that approximately 80,000 cars to be used for war purposes have been imported since. In number of inhabitants per car the Principality of Monaco heads the list with one car for every 95.6 inhabitants which shows a higher proportion of cars to population than any other country. England comes second in this particular with one car to every 268.5 persons.

The list below shows the number of cars in service in European countries during the latest years for which returns are available.

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Organize to Supply Engineers

MILWAUKEE, Aug. 5—To provide an organization which will devise ways and means of supplying the Government with competent engineers upon call, representatives of each of the Milwaukee chapters of national engineering associations have formed a council under the direction of John D. Ball, E.E., M.E., secretary of the department of public affairs, Mil-

A Census of Europe's Passenger Cars

Countries	Number of cars.	Year	Population	No. of inhabitants per car.
Great Britain	171,607	1917	46,087,000	268.5
Germany	95,000	1914	65,000,000	684.0
France	98,400	1916	39,600,000	402.0
Italy	35,500	1918	35,587,784	1,002.0
Russia	27,900	1916	148,289,000	531.5
Austria Hungary	19,360	1916	52,608,000	2,671.7
Belgium	14,700	1916	7,580,000	515.6
Spain	10,253	1918	20,400,000	1,989.6
Holland	10,000	1917	6,583,226	658.0
Sweden	9,030	1916	5,638,500	626.5
Denmark	8,500	1917	2,919,000	343.0
Switzerland	6,157	1914	3,765,000	611 0
Portugal	3,211	1917	5,433,000	1.692.0
Norway	3,067	1918	2,240,000	730.0
Bulgaria	3,050	1916	4,330,000	1,419.6
Roumania	2,500	1913	7,248,061	2,899.0
Finland	2,000	1917	3,600,000	1,800.0
Greece	800	1917	3,912,000	4,890.0
Turkey	500	1913	.....	....
Monaco	230	1916	22,000	95.6
Serbia	200	1914	4,490,000	22,450.0
Malta	100	1917	224,000	2,240 0
Gibraltar	45	1917	18,500	411.0
Cyprus	15	1917	273,857	18 257.0
Rhodes Islands	14	1917	30,000	2,142.8
Crete	3	1917	365,000	121,666.6

waukee County Council of Defense. All engineers will be listed and their availability recorded so that when the Government needs technical men of a certain class recommendations can be made. The Milwaukee district draft board, the Council of Defense and each of the larger industries in Milwaukee county will each select a representative on the council. The plan is said to be original with Mr. Ball and much benefit is expected to result, in view of the present unsatisfactory situation with respect to supplying the Government with talent.

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Avert Serious Machinists' Strike

MILWAUKEE, Aug. 5.—The combined efforts of seven Government labor conciliators averted a serious strike of union machinists in three large plants at Madison, Wis., on Aug. 1. Six hundred men walked out of the shops of the Four Lakes Ordnance Co., Steinle Turret Machine Co. and the Madison-Kipp Lubricator Co. at 11 o'clock a. m. to enforce various demands. As the result of conferences during the afternoon, all of the men returned to work on the following morning, having agreed to let the War Industries Board settle all disputes. Organized machinists in ten other plants at Madison remained on the job with the same provision. All of the shops affected are devoting all or the greater part of their facilities to Government business.

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Michigan Names Labor Advisory Board

DETROIT, Aug. 3—The organization committee for Michigan of the United States Employment Service and the Public Service Reserve has named the following advisory board for the state:

James V. Cunningham, director of the Employment Service, chairman; John A. Russell, director of the Public Service Reserve, vice-chairman, and Perry Ward, secretary of the Michigan Federation of Labor, W. G. Bailey, A. A. Templeton and T. Stuart Foote of Grand Rapids, with William B. Wreford, secretary ex-officio, will supervise the distribution of all unskilled labor in the state to manufacturing plants, particularly those engaged in war work.

The advisory committee has approved the appointment of forty-seven Community Labor Boards, which will assist in the mobilization and distribution of common labor for war industries.

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Appoint Wisconsin Labor Representatives

MILWAUKEE, Aug. 5—E. J. Kearney of the Kearney & Trecker Co., milling machines, Milwaukee, and F. H. Claussen, head of the Van Brunt Mfg. Co., Horicon, Wis., agricultural tools, have been appointed representatives of the employers of Wisconsin on the state advisory board under the new federal labor recruiting program. Arthur W. Berresford, general manager of the Cutler-Hammer Mfg. Co., Milwaukee, has been selected as employers' representative on the community board for the Milwaukee district.

Cannot Do Business in Wisconsin

Foreign Corporations With Non-Par Value Stock Cannot Continue

MILWAUKEE, Aug. 5.—Nearly a score of large manufacturing concerns in Milwaukee are affected by an opinion given by the attorney general of Wisconsin to the effect that foreign corporations with non-par value capital stock cannot be licensed to do business in Wisconsin. Under the opinion such corporations will lose their charters and close their plants in this State unless they reincorporate and place a fixed value upon their shares. However, before any drastic step is taken, the opinion will be printed as a brief and submitted to each company affected, with the suggestion that its attorneys file briefs at a general hearing to be held in about thirty days.

Among the concerns affected are: A. O. Smith Corp., Milwaukee; Allamer Truck Co., Chicago; Nash Motors Co., Kenosha, Wis.; Milwaukee Electric Crane & Mfg. Co., Milwaukee; Badger Mfg. Corp., Milwaukee; National Aniline & Chemical Co., New York; Globe Shipbuilding Co., Superior, Wis., and others.

The question of the validity of the Wisconsin charters of these and other corporations arose when the Railroad Commission, acting as administrator of the Wisconsin Blue Sky act, received an inquiry from the secretary of state as to the basis upon which the license fee of corporations with capital stock that has no nominal or par value is to be determined. Then it was found that the State laws prevent the issue of licenses to such corporations.

In some instances, corporations originally organized under the laws of Wisconsin, desiring to expand, reincorporated under the laws of Delaware or Maine, greatly increased the capitalization, but provided that shares be without par value, then applying for charters in Wisconsin as foreign corporations. The opinion of the attorney general means that this cannot be done legally.

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Flint Has Federal Employment Office

FLINT, Aug. 1—The United States Employment Service, Department of Labor, has established an agency at 119 East Kearsley Street, with J. B. Laing, formerly of the Buick Motor Co., the examiner in charge. The agency will take care of the placing of men and women in factories and concerns doing government work. Persons desiring work of this kind can apply at the office the same as for any factory position.

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Metal Workers Get 8-Hour Day

MILWAUKEE, Aug. 5—Nearly 40,000 men in the metal trades of Milwaukee county are affected by the voluntary inauguration of the basic 8-hour day by most of the large metalworking industries of the district, effective Aug. 1. All of the plants are engaged largely in executing Government contracts. The concession does not mean a reduction of actual working hours, because that would mean curtailment of output, but while the men will work on the same schedules as before they will receive time and a half for all overtime worked above eight hours. This will net the men an increase of about 5 per cent in wages. Most plants are working 54 to 55 hours a week.

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Shortage of Skilled Labor Still Acute

WASHINGTON, Aug. 3—Shortage of both skilled and common labor continues acute, according to reports from the various centers and trades of the country. Machinists are needed throughout the East and on the Pacific Coast. There is a general shortage of boilermakers. Toolmakers, lathe hands, blacksmiths and iron workers are wanted in New England, Pennsylvania and along the Great Lakes. Many hulks are reported lying in the river at Portland, Oregon, because of shortage of men to install the machinery.

Mechanics are in demand in New England, New York, Chicago, Atlanta, Georgia, Seattle, Washington and southern Wisconsin. Automobile workers and electrical workers are, however, by no means scarce, according to the reports which show a surplus of automobile workers in the West and Southwest, Missouri, West Virginia and other points, with the only demand coming from Seattle.

Munitions workers are needed at Wilmington, Del., and in northwestern Ohio.

A common labor shortage is reported from Pennsylvania, Connecticut, Virginia, Illinois, Iowa, Oregon and Washington. The only surplus of common labor is reported from the South.

Farm labor is needed throughout the country due to the scarcity of farm workers created by the high wages offered in the war industries and especially shipbuilding.

A surplus of inexperienced female workers and a shortage of experienced women workers is also reported.

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Pants, Hair Nets and Low Heels for Women Machine Operators

ALBANY, N. Y., Aug. 3—In the new "dangerous machinery" code of the New York State Industrial Commission, the fact that the number of women engaged in industrial pursuits has materially increased is taken into account and special provisions are recommended for their safeguarding as follows:

"It is recommended in relation to female operatives that where their hair is in danger of being caught in moving machinery, they shall wear caps or hair nets; that where their clothing is in danger of being caught in moving machinery, they shall wear pants; that they wear shoes with low heels."

Obenberger Leaves A. O. Smith

MILWAUKEE, Aug. 5.—Frank P. Obenberger, for the last five years general superintendent of the A. O. Smith Corporation, Milwaukee, and superintendent of the forge works for four years, before that, resigned Aug. 1 to become associated with his father in the general management of the John Obenberger Forge Co., West Allis, Milwaukee, which is doubling its capacity for the manufacture of crankshafts, camshafts and other automotive forgings. Officers of the Smith company and eighty department heads tendered Mr. Obenberger a dinner, at which he was presented a diamond-studded scarf pin by the officers and a gold watch and chain on behalf of the working force.

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L. H. Morrill, who has had charge of the engineering department of the Northway Motors Co. for the last 2 years, resigned, and has been appointed assistant engineer of the Buda Co., Harvey, Ill.

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J. R. Harrison has been appointed sales and advertising manager of the Parrett Tractor Co., Chicago. He was formerly advertising manager of the Chalmers company.

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Frank L. Wurl, who has been intimately connected with many new developments in automotive ignition, starting and lighting, has been promoted sales engineer of the Remy Electric Co. located at Detroit.

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C. A. Spear has been appointed New York State Division sales manager for the Selden Truck Sales Co., Rochester, N. Y. He succeeds L. S. Hallowell, who is to become affiliated with the Philadelphia Selden Sales Agency.

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G. M. Rockwell, recently connected with the sales department of the Republic Motor Truck Co., Alma, Mich., has been appointed district manager and special representative of the District of Columbia for the Acme Motor Truck Co. His territory will include Virginia, Maryland, Delaware and North Carolina. **J. A. Bell**, formerly connected with the White Co., Cleveland, has joined the Acme organization as district manager, with the Gulf States east of Texas as his territory. **F. P. Walker** will have charge of the western half of Iowa and the entire state of Nebraska.

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H. D. W. Mackaye, who has been connected with B. F. Everitt in the receivership settlement of the affairs of the Ross Automobile Co., Detroit, has entered Government service in connection with munitions production, and is located now at Jackson, Mich., as a citizen representative of the Ordnance Department.

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Howard C. Caldwell, assistant advertising manager of the Haynes Automobile Co., Kokomo, Ind., has resigned to enter the Great Lakes Naval Training Station.

Men of the Industry

Changes in Personnel and Position

Nash Men Dine Charles W. Nash

KENOSHA, WIS., Aug. 5.—Department heads and foremen of the Nash Motors Co., Kenosha, Wis., tendered a banquet in honor of Charles W. Nash, president and general manager of the company, who left July 31 for Washington to assume his duties as assistant to John D. Ryan, director of aircraft production, in charge of engineering and production. While in the Government service, Mr. Nash has relinquished active connection with his company.

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W. O. Kennington, who was assistant chief engineer of the Remy Electric Co., Detroit, at the time of the outbreak of the war, has returned to Detroit from the war front, where he is connected with the British Air Ministry. He will remain in this country for a month and then return.

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H. H. Gildner, manager of the Flexite department of the F. R. Blair Co., New York, has been elected vice-president of the organization.

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George L. East, who has been associated with the Oldsmobile interests for 11 years, has resigned his connection as assistant sales manager to join the Gulf Oldsmobile Co. at New Orleans, distributer of Oldsmobile cars for Louisiana.

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Athletic Building Dedicated to Dead Flyer

MOUNT CLEMENS, MICH., Aug. 5—The new athletic building which has just been completed at Selfridge Field was dedicated Saturday afternoon to the memory of Second Lieutenant John P. Boyle, an aviator and athlete, the first officer to meet death at the field. Local people assisted substantially in erecting the building, pledging more than $2,200.

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Dividends Declared

The Stewart-Warner Speedometer Corp. has declared a regular quarterly dividend of 1½ per cent, payable Aug. 15, to stock of record July 31.

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The National Acme Co., Cleveland, has declared its quarterly dividend of three-quarters of 1 per cent, payable Aug. 31 to stockholders of record Aug. 15.

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The Continental Motors Corp., Detroit, has declared a 1½ per cent dividend to stockholders owning common stock of record at the close of business Aug. 10, payable Aug. 20.

Ayres Elected an Officer in D. A. D. A.

DETROIT, Aug. 5—J. C. Ayers, of the Towar-Ayres Co. and Denby Motor Truck Co., was elected vice-president of the Detroit Automobile Dealers' Association at a meeting of that organization last week. He replaces George W. Franklin on the board, the latter having resigned on disposing of his automobile interests.

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General Motors Holds Export Convention

NEW YORK, Aug. 5—The first annual convention of the General Motors Export Co.'s executives, field men and department heads began on Aug. 1 and will be continued to Aug. 10. The program is very comprehensive, covering a series of meetings at the New York offices and also including a tour of educational inspection through the various factories at Detroit, Pontiac, Flint, Lansing and Jackson.

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U. S. Air Accidents Are Lowest

WASHINGTON, Aug. 5—The United States air service schools have a record, it is officially reported here, of a lower percentage of accidents and fatalities than those of the Allies or the central powers. The average is one man killed for every 3300 hours of flying. Following is the list of fatalities in actual flying sustained in this country from Sept. 1, 1917, to July 20, 1918:

Rank	Number
Officers	74
Cadets	65
Enlisted men	9
Civilian instructors	7
Total	155

United States schools, in attaining the present rating, have proceeded on the theory that three out of four deaths in flying at the front have been due to lack of judgment, and that but one man of four has been killed in action. Further, that if a cadet is given all his instruction in the flying schools in the United States he will put his preliminary air training out of mind when he finally reaches the front and concentrate entirely on fighting. Because of the fact that he has been perfectly trained as a "stunt" flyer, he will be the more able to pick up his fighting tactics quickly.

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Farmers Use More Trucks

AKRON, Aug. 5—According to statistics furnished by the B. F. Goodrich Rubber Co. farmers are the largest users of trucks, heading the list with a total of 79,789 trucks during the year 1917. These are engaged in the haulage of grain, produce, truck and livestock in the rural districts. Manufacturers have a total of 65,928 and retailers operate 64,486. According to the figures there are 238 commercial vehicle manufacturers in the United States, 90,000 trucks having been made in 1917 and it is estimated that the 1918 production will go over the 200,000 mark.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

Wisconsin Truck Starts

OSHKOSH, Aug. 5—The Wisconsin Duplex Automobile Co., Oshkosh, Wis., on August 1 began quantity production of a single type of 1½-ton commercial car employing a quadruple drive transmission system, which has been undergoing exhaustive tests for more than two years. Five trucks are now coming through and the next group will be ten, gradual increases being made until the regular group reaches twenty-five cars. According to William A. Besserdich, general manager, the company has commercial orders which will require its capacity until well into 1919.

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Reliance Getting Ready

APPLETON, WIS., Aug. 5—The Reliance Motor Truck Co., Appleton, Wis., now has its new plant in operation and by the middle of August will be turning out commercial chassis in quantity. The entire equipment of the former works at Racine, Wis., has been transferred to the new shops.

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Body Builder Gets Boat Contract

RACINE, WIS., Aug. 5—The Racine Mfg. Co., Racine, Wis., a large manufacturer of motor car bodies, has taken a Government contract to build 500 metallic lifeboats, fully equipped, for transports and new vessels of the United States emergency fleet. About 30 per cent of the capacity will be devoted to the contract, deliveries on which are to begin September 1. The lifeboats will be 24 ft. long with accommodations for forty persons and will be equipped with oars and a sail. Seats will run fore and aft as well as crosswise and will contain air compartments and lockers for medical supplies, oil, food, etc.

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Forms New Die and Tool Company

BOWLING GREEN, OHIO, July 31—The Bowling Green Die & Tool Co., a new $25,000 organization, has effected the following organization: President, Clyde V. Urschel; vice-president, W. M. Gray; secretary-treasurer, Philo S. Hankey; manager, R. L. Swartz. These officers, with P. M. Davidson, form the directorate.

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Enlarge Fordson Plant

DEARBORN, MICH., Aug. 3—The plant of Henry Ford & Son is being enlarged steadily to aid production on a large scale. A new tool room and a large addition to the stock room are under construction.

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Halladay Gets Cameron Buildings

LEXINGTON, OHIO, Aug. 3—The Halladay Motor Car Co. has purchased the factory buildings of the Cameron Car Co., Attica, Ohio, and will occupy them October 1.

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New Truck Cab for Columbia Truck

PONTIAC, Aug. 3—A new truck cab will be manufactured by the Columbia Motor Truck & Trailer Co., which will be listed at $150 extra. One of the features of the new device is that windows may be lowered, which eliminates the necessity for storing them. The window and the door drop out of sight, are securely fastened and do not rattle. If desired, the entire door can be taken off.

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Reorganize Derf Spark Plug

NEW YORK, Aug. 3—The Derf Mfg. Co. has been generally reorganized and W. Earl Clayton appointed general manager. Fred Gerken was named president of the company. The output is at present 1000 plugs a day and plans are being laid for increasing this during the next two months.

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Chicago Pneumatic Enlarges Plant

CLEVELAND, Aug. 1—The Chicago Pneumatic Tool Co. is erecting a three-story building adjoining its present plant at East Forty-ninth Street and Lakeside Avenue. The structure is to be 293 by 56, and will contain about 50,000 sq. ft. of floor space. The estimated cost of the addition is said to be $150,000.

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State Fair to Include Automobile Show

DETROIT, Aug. 3—Detroit's dealers have purchased sufficient space to warrant the Michigan State Fair putting on its annual automobile show this fall. Secretary-Manager G. W. Dickinson announced that the show would be one of the features and will occupy the first floor of the Automobile Building. The second floor of the building has been taken over by the United States Government for a display of war materials, trophies from the European battlefields and other governmental exhibits that are of interest to the general public.

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Miller Sales at $18,000,000 Rate

AKRON, Aug. 4—Sales of the Miller Rubber Co. are running at the rate of $18,000,000 for 1918, compared with $11,368,627 for 1917, $7,583,606 for 1916, and $3,150,595 for 1915. Earnings after war taxes were deducted for 1917 were equal to 24 per cent on the junior issue for preferred dividends.

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Detroit-Toledo Truck Line

DETROIT, Aug. 3—A motor truck freight and express line service between Detroit and Toledo is to be started by the H. C. Roberts Storage & Transfer Co., with daily service both ways. The service will start operation Oct. 1, and will carry freight to and from all cities and towns en route via the Rockwood and Monroe route.

Milwaukee Home for Lavine

MILWAUKEE, Aug. 5.—The Lavine Gear Co., Racine, which is erecting a complete new manufacturing group in Milwaukee, is completing arrangements for the transfer of its entire business from Racine to Milwaukee. The capital stock is being increased from $100,000 to $1,000,000 to provide for the general expansion of production and marketing of its line.

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Puritan Gets Argo Electric

DETROIT, Aug. 3—The Puritan Machine Co. has purchased the Service repair parts business of the Argo Electric Co., formerly of Saginaw, Mich. The entire stock of the Argo repair parts has been moved to Detroit.

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Cleveland Branch for Joliet

JOLIET, ILL., Aug. 3—The Joliet Oil Tractor Co. has opened a distributing office for Ohio at 1754 East 17th Street, Cleveland, which will do business under the style Bates-Steel-Mule Co. of Ohio. This office has been established to handle the new Model D Bates Steel Mule exclusively and will give factory service to all Ohio dealers and customers. A branch will be opened at Columbus to assist in distribution. It is the intention of the parent company to place a limited number of dealers in Ohio this year. Probably not more than twenty dealers will be appointed in 1918, as this number will take the entire quota for Ohio this season. Approximately one-half the quota has already been assigned.

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International Harvester to Dissolve

WASHINGTON, Aug. 3.—The Department of Justice states that at the ensuing term of the Supreme Court the International Harvester Co. will dismiss its appeal from the decree of the District Court adjudging it a combination in restraint of trade and ordering its dissolution. The effect will be to leave the original decree of the District Court as the final decree in the case. In part the decree will compel the International Harvester Co. to dispose of the harvesting machine lines known under the trade names of "Osborne," "Milwaukee," "Champion," the trade names themselves, and all patterns, drawings, dies, blue prints, jigs and other machines and equipment used in the manufacture of those lines, to a responsible and independent manufacturer or manufacturers of agricultural implements. The company must also dispose of the plants and works at Springfield, Ohio, and Auburn, New York, where the Champion and Osborne lines are made.

If not otherwise disposed of in one year after the close of the existing war the above will be sold at public auction to the highest bidder. After December 31, 1919, the company will be prohibited from having more than one representative or agent selling agricultural implements in any city or town in this country.

Hydro-airplane Base to Cost $2,000,000

New Navy Department Training Base at Galveston Will Be Largest in U. S.

GALVESTON, Aug. 3—It is authoritatively announced that the hydro-airplane training base which the Navy Department will construct here will cost approximately $2,000,000, and will be the largest in the United States. The proposed buildings, for which plans are now being drawn by L. B. Hyde, civil engineer in the Navy Department, will cover 60 acres.

Plans call for the erection of six hangars, built in two sections, and with accommodations for 24 hydro-airplanes. The hangars will be erected at the northeastern part of the site fronting Galveston Bay. Each section will be 104 x 105 ft. in area and completely equipped for the housing of flying machines. Each section of the hangars will be provided with a landing pier 200 ft. in length. To the south of the hangars will be the machine-shops and repairshops.

A considerable portion of the site will be devoted to the ground school, where student aviators will receive preliminary training.

An observation tower, 120 ft. in height, will be erected, from which the officers in charge of training may have a good view of the flyers in training and observe the character of their work.

There will also be an office building and an administration building, each two stories high.

The building to be used as quarters for the officers and student aviators also will be a two-story structure, somewhat in the shape of a letter H. The ground floor of one side of the building will be devoted to the recreation room, dining room, kitchen, store room, refrigerators, etc. The remainder of the building will be quarters, with each bedroom 10 ft. 6 in. by 12 ft. 6 in.

Barracks for several hundred men, with mess hall and other necessary equipment, will be provided, as well as a dispensary.

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Dayton-Wright Ships 1000th Plane

DAYTON, Aug. 1—The Dayton-Wright Airplane Co. shipped yesterday its 1000th airplane, and commemorated the event by giving its employees a holiday to-day. The average daily production of the company is twenty.

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It's the "Air Service" Now

WASHINGTON, Aug. 2—Hereafter "Air Service" will be the general term used to denote either the Division of Military Aeronautics or the Bureau of Aircraft Production. Officers and enlisted men will be known as members of Air Service, Military Aeronautics or Air Service, Aircraft Production, as the case may be. The chief of aircraft production will hereafter be known as the Director of Aircraft Production. The chief of the Division of Military Aeronautics will be known as the Director of Military Aeronautics.

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Name Four New Flying Fields

WASHINGTON, Aug. 3—Four new flying fields in the neighborhood of Hazelhurst Field, Mineola, Long Island, have been completed and named after aviators who died in the service. They are under the command of Major C. K. Reinhart, J. M. A. The field at Wantaugh, L. I., has been named Lufbury Field in memory of Major Raoul Lufbury. Field No. 2 at Mineola, L. I., is now known as Mitchel Field in honor of Major John Purroy Mitchel. The field near Babylon, L. I., is named the Henry J. Damm Field in memory of Lieut.-Col. Henry J. Damm. The field at Commack, L. I., is designated Brindley Field in memory of Major Oscar A. Brindley.

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Mail Flight Records Broken

WASHINGTON, Aug. 2—The air mail service records were broken yesterday. Major C. K. Phinehart flew from Mineola, L. I., to Washington in 2 hr. and 15 min. Another extraordinary flight was made when Lieut. Killgore left Philadelphia at 1.25 p. m. in a severe rainstorm and reached Washington on schedule time at 3 p. m. Lieut. Killgore broke his goggles and was compelled to fly the entire distance without protection for his eyes. He flew at a height of 1500 ft. entirely by compass. Thus far storms have not interfered with the air mail service.

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De Haviland "Scandal" Exploded

WASHINGTON, Aug. 1.—Another airplane "scandal" rumor exploded harmlessly yesterday when Secretary Baker specifically denied newspaper reports that the De Haviland plane production was held up. There was no official foundation for the rumor. The rumors told that General Pershing had requested complete halt of the De Haviland production and pointed out many serious faults. There is apparently foundation for the statement that General Pershing recommended some changes in the De Haviland plane, but this is about all the truth which the reports contain.

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Tries Dropping from Moving Plane

PARIS, FRANCE, July 30—What is believed to be the first experiment of falling from a moving airplane with a parachute has been successfully carried out by Captain Sarret, a French aviator. He dropped 800 meters with a parachute 12 yards in diameter and landed safely.

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To Conserve Chains

WASHINGTON, Aug. 1—A campaign of education is planned by the War Service Committee of chain manufacturers for the conservation of chains. Members of the committee are: C. M. Power of the American Chain Co.; Staunton B. Peck, Link-Belt Co., and A. B. Way, Bridgeport Chain Co.

Deaf Mutes Won't Make Good Fliers

Official Tests Show That They Lack the Necessary Qualifications

WASHINGTON, Aug. 3—Numerous reports that because of lack of dizziness deaf mutes would make good fliers are denied here to-day by the Division of Military Aeronautics. An erroneous idea persistently circulated about the country has led hundreds of deaf mutes to believe that they were desired as fliers in the Army and many have sought enlistment.

Two investigations were started three weeks ago because of these unauthorized reports, one to determine the source, and the other to make special tests of accuracy of deaf mutes in sensing motion.

The first investigation is not yet finished. The second investigation completed by the Medical Research Laboratory at Mineola, L. I., included tests in flights to ascertain what effect the absence of the delicate balancing apparatus that exists in normal inner ears has upon persons who are without them.

Normal men and deaf mutes were flown at different times blindfolded. The flights included level flying, climbing, left and right turns, dips and banks. The passengers were asked to record the directions. The deaf mutes failed completely. They could not even note changes of 90 degrees. Normal passengers reported changes as slight as 5 degrees. Consequently the individual with less sensitivity to a change of position is really less efficient in the air.

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Acme Motor Truck Enlarges Plant

CADILLAC, MICH., Aug. 3—The Acme Motor Truck Co. has increased the size of its plant considerably. The following additions have been built this summer: A woodworking and body shop, 65 by 80; an addition to the assembly building, 65 by 96; a heating and power-plant, 46 by 80; an office, 80 by 118; two washrooms, 12 by 30, and a dining room, 13 by 46. Another addition to the body department is contemplated in the very near future, which will be 65 by 80.

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Motor Trucks to Transport Hogs

WASHINGTON, Aug. 3—The number of hogs transported to the Omaha market by motor trucks during the first six months of 1918 has increased 180 per cent over the corresponding period in 1917. This furnishes an example of how motor trucks are relieving railroad transportation. The number carried in this way amounted to 92,780 for the period in 1918 as compared with 33,084 for the corresponding months last year. Estimating 70 hogs as an average carload in railroad shipments, the number delivered by motor trucks on the Omaha market during the first six months of 1918 aggregated more than 1300 carloads, or an average of more

than 8 carloads for every market day during the period.

The motor truck business is becoming so important that commercial organizations of Omaha are taking active measures to utilize the trucks on return trips to country points for hauling various kinds of freight. Experience has shown that motor truck marketing is as feasible in winter as in other seasons, as more that 26,000 hogs were delivered directly from farms to the Omaha market during January and February.

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Dependable Gets a Building and Site

GALESBURG, ILL., Aug. 3—The Dependable Truck & Tractor Co., recently organized here, has purchased a 5-acre tract of land which has on it an abandoned factory building with 65,000 sq. ft. of floorspace. The old structure will be rebuilt and will be utilized for assembling trucks. In addition, a new building will be constructed with a floorspace capacity of 40,000 sq. ft.

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Ordnance District for St. Louis

WASHINGTON, Aug. 1—The Ordnance Department has established a new production district to be known as the St. Louis Production District. Headquarters will be at St. Louis. M. E. Singleton of that city is the ordnance district chief. Division of the country into production districts was undertaken by the Ordnance Department as part of its plan of decentralization and in order to promote more rapid and efficient methods of carrying out the enormous ordnance program. Under this system the production work in each district is under its own responsible head, who is answerable directly to the Ordnance Department in Washington.

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Harroun's Patent Allowed

WAYNE, MICH., Aug. 5—Ray Harroun, vice-president of the Harroun Motors Corp., has received notice from the patent office that his claim for exclusive rights to the shock absorbing steering wheel in use on all Harroun cars has been allowed. His patent has been transferred to the company.

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Automobile Body Plant Burned

BOSTON, Aug. 5—The big plant of the Sargent & Ham Company, manufacturers of automobile and carriage bodies on Sudbury Street, was gutted by fire this morning, the loss being approximately $60,000. There were a number of finished and nearly finished automobile bodies on the floors, and they will be practically a total loss. The structure was six stories and the upper floors were destroyed so that the roof fell in, carrying away the two upper floors. Several firemen had narrow escapes from injuries. The fire started about 1 in the morning, and so there were no workmen in the building. It is believed that it was caused by spontaneous combustion.

Government Wants to Protect Labor

Detroit Manufacturers Asked to Protect Skilled Help by Aiding in Obtaining Exemption

DETROIT, Aug. 5—At a meeting called by the ordnance and aircraft sections of this territory the government representatives emphasized again and again the necessity for manufacturers to protect their skilled men. Unless every manufacturer of munitions secures deferred industrial classification in the draft for every man in his employ necessary to production, he is acting unpatriotically, according to the Government representatives. Not only will the manufacturer suffer, but the Government will be injured in its prosecution of the war.

Eight hundred and seventy-five manufacturers of Detroit working on war material were present. The ordnance division was represented by Fred Robinson and the aircraft section by T. P. Myers. Judge James Murfin represented the district board of the selective service and R. K. Davis the adjutant general's office. Allan A. Templeton, advisor of the survey and conversion sections of the War Industries Board, presided at the meeting.

Mr. Templeton stated that the Government wants all manufacturers to give it every man that they can spare, but the Government does not want them to send a single man into the army whose loss to the manufacturer would delay the production of war materials. Rather, the Government wishes to help all manufacturers to save their important and necessary men. He expressed the thought that they would not be really patriotic unless they did as the Government directed them in this matter.

Mr. Robinson, in charge of the ordnance department production in this district, declared that there is in this country, at the present time, a shortage of skilled labor of more than 250,000. This is felt most acutely in the East and Detroit has not suffered greatly owing to the fact that men from automobile factories, which have curtailed production, have drifted into war industries. The time is coming, however, when the supply of these men will cease and Detroit manufacturers will be in the same extremely serious situation as is the East to-day. More finished products for the ordnance department are made in this district than in any district in the country, and the total output is greater than any district with the exception of Pittsburgh, with its large steel production.

It was announced at the meeting that an industrial relations department of the aircraft service is being perfected to handle the problems of securing labor, handling disputes, settling industrial unrest, etc. It is believed this section will be in operation within 30 days.

R. K. Davis, speaking as a representative of the adjutant general, said: "We want every manufacturer of war materials to get deferred classification on its skilled men—men necessary to their production. We also want the manufacturers to be reasonable in their demands, and not try to secure deferred classification for bookkeepers, stockkeepers and the like."

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To Tabulate Results of Conservation Movement

DETROIT, Aug. 5—Many retailers are co-operating with the Wholesale Merchants' Bureau in the latter's campaign for conservation of truck time and man power. Over 125,000 cards and circulars requesting co-operation in every way possible to make this movement a success have been sent them. Placards on delivery trucks are now being used by a large number of wholesale merchants. The campaign was started by the Wholesale Merchants' Bureau in an effort to show the absolute necessity, under present war-time conditions, of conserving man power and truck time. In order that this may be accomplished it is essential that all avoidable delays in receipting for goods be eliminated. Efforts are now being made to arrive at some definite figures showing the actual truck time saved by each wholesaler as a result of this movement.

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Gardner's Interest in St. Louis Chevrolet Sold

ST. LOUIS, Aug. 5—Russell E. Gardner has disposed of the interest of himself and two sons in the Chevrolet Motor Co. of St. Louis because his sons, Russell E. Gardner, Jr., sales manager for the company, and Frederick Gardner, production manager, had entered the service of the United States Navy. Gardner did not name the purchaser, but it has been understood here that the General Motors Co. had an option on the Gardner stock for $1,000,000. The giving of the option was announced at the time of the purchase of 105 acres here for a body factory and assembly plant for the General Motors. The deeds for this land were completed last week. The Gardners became interested in the Chevrolet company when they turned their large buggy factory into a body building plant.

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Conaphores on Pierce-Arrows

NEW YORK, Aug. 2—The Edward A. Cassidy Co. announces that the Pierce-Arrow Motor Car Co., Buffalo, has adopted the Conaphore headlight lens, manufactured by the Corning Glass Works, Corning, N. Y., as standard equipment on its passenger cars.

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Moto-Meter Equipped Tractors at Salina

NEW YORK, Aug. 1—Eighty-two per cent of the tractors taking part in the demonstration held at Salina, Kan., were equipped with the Boyce Moto-Meter.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Coal Output Drops Slightly; Alarming Shortage Not Likely

Production has dropped off slightly from the high records of the recent past. This diminution in the output is, however, not particularly serious and if the present rate can be maintained there can be no such suffering for want of coal as the country experienced last winter.

The coal supply problem is still one of transportation rather than production. It has been fairly well demonstrated that if the mines are supplied with cars they are, as a general rule, able to turn out a heavy output and one well up to the needs of the country. One or two roads have had such heavy traffic in coal that much congestion with some wrecks and derailments has resulted.

In the West and Middle West production is well up to the demand and certain grades and sizes are still selling below the Government schedule. In the East, however, particularly along the Atlantic Seaboard, demand is strong and dealers are unable to accumulate any stocks except of one or two of the smaller sizes. Of these there is now a slight surplus, but it is questionable if this would be maintained were bituminous coal available with which to mix the fine anthracite.

One incident of the week, small in itself but which may be far-reaching in its results, was the closing of four small mines in the Pittsburgh district because they shipped dirty coal. It is evidently the intention of the Fuel Administration to tolerate no such practices in this respect as caused such justifiably adverse criticism of the industry as was heard last winter.—*Coal Age.*

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Mix-up in Sunday Closing Plan

WASHINGTON, D. C., Aug. 6—There is somewhat of a mix-up regarding the Sunday closing plans, which are part of the War Service Recommendations of the National Automobile Dealers' Association, because of a joint statement issued by the Fuel Administration and the War Industries Board to the effect that there has been no governmental order or recommendation against the sale of gasoline on Sunday.

Until further conference by the parties concerned it is not possible to make a definite statement as to the outcome.

The Sunday closing is a part of the dealers' recommendations as a means for conserving labor and not gasoline. Opposition was met in several towns on the part of the big oil companies which operate their own filling stations and have a large Sunday business.

The dealers' recommendations were outlined last winter after the dealers had been called to Washington by Chairman A. W. Shaw of the Conservation Division of the War Industries Board, as were many other trades, and asked to make economies in the automobile trade. The recommendations followed, their chief object being the conservation of labor through reducing certain of the dealers' activities.

Following the statement of the Fuel Administration and the War Industries Board, which has upset the plans of the dealers in many sections, the Conservation Division has issued a statement which throws little light on the possible outcome of the matter.

President F. W. A. Vesper of the N. A. D. A., who is also chairman of the dealers' War Service Committee, is to confer with the Conservation and Fuel bodies this week in an effort to get a definite understanding as to whether the oil companies are willing to co-operate with such local associations of dealers as wish to conserve labor through Sunday closing.

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Wire Wheel Corp. Makes Government Agreement

NEW YORK, Aug. 3—By virtue of a license agreement just entered into between the government and the Wire Wheel Corp. of America the whole ownership of the Pugh triple lacing patent is acknowledged by the former and the corporation grants the government the right and power to make, use and sell wire spoked wheels embodying the invention in the United States, its territories and dependencies during the present war and for a period of three months after peace is declared. The corporation has given the government the right to sub-license others to make for and sell to the government wire spoked wheels embodying this invention. These sub-licenses will be non-transferable and will not permit the manufacture of wheels except for the government. The government will pay the Wire Wheel Corp. a royalty on each wheel and will keep it informed of the names of the sub-licensees and details governing the issue of the sub-licenses.

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Jordan Pays Dividend on Preferred Stock

CLEVELAND, Aug. 5—The Jordan Motor Car Co. on Aug. 1 paid a dividend of 8.6 per cent to the holders of the original preferred stock. It is stated that the company has been turning over its capital practically every 30 days and that in July its earnings were at the annual rate of 160 per cent on the capital invested.

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Frankfurter on Priorities Board

WASHINGTON, Aug. 7.—Felix Frankfurter, chairman of the War Labor Policies Board, has been appointed a member of the Priorities Committee of the War Industries Board, on which he will represent the Department of Labor.

Coal, Coke and Labor Are Factors in Steel Production

In respect to steel supply and demand, the outcome of the week has been, first, a decision by the War Industries Board averse to creating the additional reservoir of ship steel asked for by Director-General Schwab; second, the gathering of data showing that the 33,000,000 tons of finished rolled steel which has been taken as the present annual capacity of the country is considerably too low. In one stretch of five weeks, chiefly in May, it is shown that the rate was close to 38,000,000 tons of finished products per year.

It appears that the ship steel in process or in stock at shipyards and fabricating plants amounts to about 1,000,000 tons. While the War Industries Board did not consent to increase the present shipments of 50,000 tons a week of ship plates by 20,000 tons a week through the next quarter, or even by the 10,000 tons a week later asked for, its members are confident there will be no break in the shipbuilding program for lack of steel.

Steel Production Increase Studied

The deciding influence in the matter was the fear of members of the board that the impounding of additional definite tonnage for ship purposes might mean the suspension of small but in the aggregate important private industries.

Ways and means of increasing steel production have been carefully studied. But coal and coke labor are still the key, rather than extensions of rolling-mill capacity. So far as the latter is concerned, probably 1,000,000 tons more will be ready by Jan. 1, chiefly in plates, but partly in large rounds, the Steel Corporation now having a $750,000 mill for this purpose under construction in the Pittsburgh district.

Merchant Furnaces Increase Output

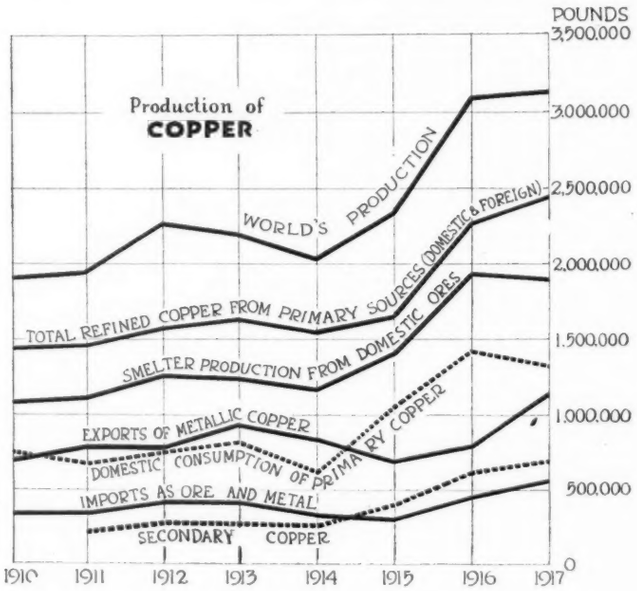
The statistics for last month show that to increase pig iron output is no easy matter. In the 31 days of July the make was 3,420,988 tons, or 110,354 tons a day, against 3,323,791 tons in June, or 110,793 tons a day. The merchant furnaces increased their output nearly 2000 tons a day as compared with June, while the steel works furnaces fell off nearly 2500 tons a day.

August humidity may bring down production, and probably will, but an increased rate would otherwise result from the blowing in of additional furnaces. The active list shows a net gain of 8 in July. The number in blast Aug. 1 was 364, with an estimated daily capacity of 112,600 tons against 356 on July 1 with a daily capacity of 111,130 tons.—*Iron Age.*

AUTOMOTIVE MATERIALS MARKETS

Material Market Prices

Acids:
Muriatic, lb. ..... .02-.03
Phosphoric, ct. ..... .35-.39
Sulphuric (60), lb.. .09
Aluminum:
Ingot, lb. ..... .33
Sheets (18 gage or more), lb. ..... .40
Antimony, lb. ..... .13-.13¼
Burlap:
8 oz., yd..... .19
10 oz., yd..... .24½
Copper:
Elec., lb. ..... .26
Lake, lb. ..... .26
Fabric, Tire (17¼ oz.):
Sea Is., combed, lb.1.65-1.70
Egypt, combed, lb.1.25-1.35
Egypt, carded, lb..1.20-1.30
Peelers, combed, lb.1.05-1.20
Peelers, carded, lb. .95-1.05
Fibre (⅛ in. sheet base), lb. ..... .50
Graphite:
Ceylon, lb. ..... .07½-.25
Madagascar, lb. ... .10 -.15
Mexican, lb. ..... .03¾
Lead, lb. ..... .08½
Leather:
Hides, lb. ..... .18-.35¼
Nickel, lb. ..... .40-.43
Oil:
Gasoline:
Auto., gal. ..... .24½
68 to 70 gal..... .30½
Lard:
Prime City, gal..2.25
Ex. No. 1, gal....1.55
Linseed, gal. 1.84
Menhaden, (Brown), gal. 1.20-1.22
Petroleum (crude).
Kansas, bbl. 2.25
Pennsylvania, bbl. 4.00
Rubber:
Ceylon:
First latex pale crepe, lb. ..... .63
Brown, crepe, thin, clear, lb. ..... .60
Smoked, ribbed sheets, lb. ..... .62
Para:
Up River, fine, lb. .68
Up River, coarse, lb. ..... .40
Is'and, fine, lb... .59
Island, coarse, lb. .27
Shellac (orange), gal. .70-.76
Spelter ..... .08⅜
Steel:
Angle beams and channels, lb. .... .03
Automobile sheet (see sp. table).
Cold rolled, lb..... .06½
Hot rolled, lb..... .03½
Tin ..... .94
Tungsten, lb. 2.40
Waste (cotton), lb... 12¾-.17



Copper production, domestic consumption, exports and imports for the past seven years. The curves since 1914 illustrate copper's vital importance in the production of war munitions

AUTOMOBILE SHEET PRICES

(Based on No 22 Gage. Other gages at usual differentials)

	Primes only Per 100 lbs.	Primes when seconds up to 15 per cent are taken Per 100 lb.
Automobile body stock	$5.95	$5.85
Automobile body stock, deep stamping	6.20	6.10
Automobile body stock, extra deep stamping	6.45	6.35
Hood, flat fender, door and apron, or splash guard stock	6.05	5.95
Crown fender, cowl and radiator casing, deep stamping	6.30	6.20
Crown fender, cowl and radiator casing, extra deep stamping	6.55	6.45

Automobile Sheet Extras for Extreme Widths:
Nos. 17 and 18 over 36 in. to 44 in., 10c. per 100 lb.
Nos. 19 to 21 over 36 in. to 44 in., 30c. per 100 lb.
Nos. 22 to 24 over 26 in. to 40 in., 40c. per 100 lb.
Nos. 22 to 24 over 40 in. to 44 in., 80c. per 100 lb.
Black Sheet Extras to Apply to Narrow Widths:
Oiling, 10c. per 100 lb.
Patent leveling, 25c. per 100 lb.
Resquaring, 5 per cent of gage price after quality, finish and size extras have been added.
Seconds 10 per cent less than the invoice Pittsburgh price for corresponding primes.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	61	63	..
*J. I. Case T. M. Co., pfd.	80	86	..
Chalmers Motor Co., com.	3¼	5½	—1
Chalmers Motor Co., pfd.	30	40	+10
*Chandler Motor Co	85	87	+1¼
Chevrolet Motor Co.	133	135	+2
*Fisher Body Corp., com.	37½	39½	+ ½
*Fisher Body Corp., pfd.	89	90	— ½
Fisk Rubber Co., com.	60	63	+5
Fisk Rubber Co., 1st pfd.	98	102	—1
Fisk Rubber Co., 2nd pfd.	78	83	..
Firestone Tire & Rubber Co., com.	103½	105½	—4½
Firestone Tire & Rubber Co., pfd.	92	94	—1
*General Motors Co., com.	135½	136½	—18
*General Motors Co., pfd.	81	83	+1
*B. F. Goodrich Co., com.	45¾	46½	..
*B. F. Goodrich Co., pfd.	99½	101	+1
Goodyear Tire & Rubber Co., com.	165	167	—3
Goodyear Tire & Rubber Co., pfd.	97	97½	..
Grant Motor Car Corp.	2¼	3¼	..
Hupp Motor Car Corp., com.	3¼	4	..
Hupp Motor Car Corp., pfd.	79	82	..
International Motor Co., com.	25	..	..
International Motor Co., 1st pfd.	55	..	..
International Motor Co., 2nd pfd.	..	..	..
*Kelly-Springfield Tire Co., com.	50⅞	51½	+ ½
*Kelly-Springfield Tire Co., 1st pfd.	79	87	..
*Lee Rubber & Tire Corp.	21¾	22½	+1
*Maxwell Motor Co., Inc., com.	27½	28½	..
*Maxwell Motor Co., Inc., 1st pfd.	54½	55½	—1½
*Maxwell Motor Co., Inc., 2nd pfd.	21¼	22¼	+ ¼
Miller Rubber Co., com.	110½	112½	+ ½
Miller Rubber Co., pfd.	97½	99½	+3½
Packard Motor Car Co., com.	..	125	..
Packard Motor Car Co., pfd.	94	97	..
Paige-Detroit Motor Car Co.	18	20	..
Peerless Truck & Motor Corp.	13	17	+ ½
Portage Rubber Co., com.	..	120	—2
Regal Motor Car Co., pfd.	..	..	..
Reo Motor Car Co.	14⅝	15⅜	+ ⅝
*Saxon Motor Car Corp. com.	6½	8½	+1
Standard Motor Construction Co.	12	14	..
*Stewart-Warner Speed. Corp.	59½	60½	— ¼
*Studebaker Corp., com.	44	45	— ¼
*Studebaker Corp., pfd.	84	90	+5
Swinehart Tire & Rubber Co.	50	55	..
United Motors Corp.	31¼	32¼	— ¼
*U. S. Rubber Co., com.	61	62	+ ½
*U. S. Rubber Co., pfd.	104¼	105⅞	+ ⅞
*White Motor Co.	41⅜	43⅜	+ ⅛
*Willys-Overland Co., com.	19⅛	20¼	+ ⅛
*Willys-Overland Co., pfd.	81	83	—1
Standard Parts Co.	..	..	..

*At close Aug. 3. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

	Bid	Asked	Net Ch'ge
ACTIVE STOCKS			
Auto Body Co.	..	7¾	..
Bower Roller Bearing Co.	16½	18½	..
Chevrolet Motor Co.	132	132	—2
Continental Motor Car Co., com.	5⅜	5⅝	..
Edmunds & Jones, com.	14	17	..
Edmunds & Jones, pfd.	75	90	..
Ford Motor Co. of Canada	165	173	..
Hall Lamp Co.	..	14	..
Michigan Stamping Co., com.	12¾	..	..
Packard Motor Car Co., com.	..	124	—1
Packard Motor Car Co., pfd.	93	..	..
Paige-Detroit Motor Car Co.	18¾	..	..
Prudden Wheel Co.	..	12	..
Reo Motor Car Co.	14¾	15⅛	+ ⅛
INACTIVE STOCKS			
Atlas Drop Forge	..	..	..
Kelsey Wheel Co.	25	..	..

Aircraft Production Purchases

WASHINGTON, Aug. 2—The following is a list of purchases contracted for by the Air Service, Aircraft Production:

Dyneto Electric Corp., Syracuse, N. Y., 100 battery charging sets.
Eastman Kodak Co., Rochester, N. Y., 12,600 dozen commercial plates.
Eastman Kodak Co., 750 gross process films.
Austin Mfg. Co., Harvey, Ill., 1 motor sweeper and supplies.
Dominion Asbestos & Rubber Co., 154 Nassau Street, New York City, 1380 sheets asbestos.
American Bleached Goods Co., New York City, N. Y., 90,000 yards balloon cloth.
Hawkeye Division, Eastman Kodak Co., Rochester, N. Y., 25 aerial lenses.
United States Lens Co., Geneva, N. Y., 1200 negative lenses.

July 5, 1918

Ward Leonard Electric Co., Mount Vernon, N. Y., 200 battery charging panels.
Brown & Sharpe Mfg. Co., Providence, R. I., 1 universal and tool-grinding machine.
American Bleached Goods Co., New York City, N. Y., 15,000 yards balloon cloth.
The Anderson Chemical Co., Wallington, N. J., 2000 gallons diacetone alcohol.

July 6, 1918

Brown & Sharpe Mfg. Co., Providence, R. I., 1 tool-grinding machine and attachments.
American Cellon Co., 887 Fifth Avenue, New York, N. Y., 50,000 gallons cellulose acetate dope.
Napier-Browning Co., 105 West Fortieth Street, Jersey City, N. J., 6100 connectors.

July 8, 1918

Bell & Howell Co., Candler Building, 220 West Forty-second Street, New York, N. Y., motion picture equipment, cameras, lenses, etc.
General Radio Co., 11 Windsor Street, Cambridge, Mass., 2500 receiving sets.
Geo. H. Amick, Clendenin, W. Va., 50,000 feet walnut lumber.
Guy Leonard, Baltimore, Md., services as supervisor of construction and operation of plants manufacturing acetate of lime and other chemicals.

July 9, 1918.

Western Electric Co., 463 West Street, New York City, 280 amplifiers, 300 transmitting sets.
Murray & Tregurtha Co., 340 West First Street, South Boston, Mass., 2 seasleds and motors.
Chemical Products Co., 30 Charles River Road, Cambridge, Mass., 42,000 pounds cellulose acetate.
Champion Ignition Co., Flint, Mich., 15,000 spark plugs.
Simmons Hardware Co., District National Bank Building, Washington, D. C., 5000 gunners' safety belts.
Lewis Thompson & Co., Colonial Trust Co. Building, Philadelphia, Pa., 25,000 feet Mexican mahogany lumber.
Canadian Aeroplanes (Ltd.), Toronto, Ontario, Canada, 150 planes for Curtiss Canadian airplanes.
Ericsson Mfg. Co., Buffalo, N. Y., 95 items, spares for Berling magneto D-81, contact springs, screws, interrupter levers, etc.
American Propeller & Mfg. Co., Baltimore, Md., 1000 air fans.

July 12, 1918

Century Telephone & Construction Co., Buffalo, N. Y., 109 instruction buzzer sets.
Century Telephone & Construction Co., Buffalo, N. Y., 50 instruction buzzer sets.
Russell, Burdsall & Ward Co., Port Chester, N. Y., 37,000 galvanized lag screws.

Contracts

The Dow Chemicals Co., Midland, Mich., 15,000 pounds cellulose acetate.
The Celluloid Co., 30 Washington Place, New York City, 25,000 pounds tripheny phosphate.
National Pneumatic Co., 50 Church Street, New York City, interrupter gear parts—Bowden wire controls, 300; copper pipe lines, 400 sets; trigger motors complete, 1200; generator pistons with plungers, 1800; reservoirs complete, 240.
Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., spares for JN4-D planes, ailerons, 6; engine bed crossbars, 13; control wires complete, 50 sets; wing masts, landing gear struts, etc.
Curtiss Aeroplane & Motor Corp., Buffalo, N. Y., ailerons, control wires, windshield,, wing masts, landing gear struts, turnbuckles, control pulleys, bolts and nuts, etc.
Phoenix Furniture Co., Grand Rapids, Mich., 500 Handley-Page propellers.
Goodyear Tire & Rubber Co., Akron, Ohio, tape, tubes, rubber cores, fabric rollers and stitchers.

July 17, 1918

Western Electric Co., 463 West Street, New York City, telephone material, extension bells, lamp caps, condensers, mouthpieces, plugs, receivers, etc.
Western Electric Co., 463 West Street, New York City, services development of two high power output amplifiers.
Western Electric Co., 463 West Street, New York City, telephone supplies, cords, resistance lamps, test boards, switchboard lamps, etc.
General Electric Co., Schenectady, N. Y., 868 tripods, 620 of same being 11 ft., 248 of same being 6 ft.
Singer Sewing Machine Co., New York, N. Y., 125 2-needle, 3/16-in. gauge sewing machines.
National Gauge & Equipment Co., La Crosse, Wis., 2500 oil-pressure gauges.
Cunningham Son & Co., Rochester, N. Y., 30 windlasses.

Contracts for the Marine Corps

WASHINGTON, Aug. 2—Contracts have been placed by the Quartermaster of the United States Marine Corps as follows:

July 22, 1918

Packard Motor Car Co., Detroit, Mich., chassis and equipment.
Morris Truck & Wheel Co., Philadelphia, Pa., truck wheels.

July 23, 1918

Standard Oil Co. (N. J.), Baltimore, Md., gasoline and fuel oil.

July 24, 1918

The Holt Mfg. Co., Peoria, Ill., tractor.

July 26, 1918

Donovan Motor Car Co., Boston, Mass., truck.

Not to Fix Minimum Wage Rate

WASHINGTON, Aug. 3—The National War Labor Board has decided not to establish a minimum wage rate to be applied to industry generally throughout the country.

Ordnance Contracts

WASHINGTON, Aug. 3—Contracts were placed by the Ordnance Department of the U. S. Army, as follows:

Remington Typewriter Co., New York; models of bomb release mechanism.
Edward G. Budd Mfg. Co., Philadelphia; airplane flares.
Four-Wheel Drive Auto Co., Clintonville, Wis.; spare parts for 3-ton truck, equipment and main shaft for ammunition trucks.
B. F. Goodrich Co., Akron; rubber equipment for heavy artillery repair shop.
Cleveland Twist Drill Co., Cleveland; small tools for mobile repair shops.
Warner Auto Top Co., Cincinnati; pack carriers, breech lock mechanisms.
Nash Motors Co., Kenosha, Wis.; repair parts for Nash "Quad" trucks.

To Encourage Rural Truck Routes

WASHINGTON, Aug. 3—Arrangements have been made whereby rural motor truck operators can co-operate with the Bureau of Markets in developing rural truck routes for farm products. Operators of trucks who comply with certain requirements of the bureau will receive assistance in building up business in farm produce, and will receive a sign to display on their machines stating that they are co-operating with the Department of Agriculture. Truck operators can get details of the plan by writing to the Bureau of Markets, Washington, D. C.

To License Exports for Mexico

WASHINGTON, Aug. 3—The War Trade Board will now consider applications for licenses permitting the exportation to Mexico of numerous commodities. It will be especially liberal in granting licenses for Agricultural machinery, and will license freely articles of steel and iron manufacture which will be used in Mexico for producing war material for the United States.

Transport Truck Elects Directors

MT. PLEASANT, MICH., Aug. 3—At the stockholders' meeting of the newly formed Transport Truck Co., the following board of directors was elected: H. E. Chatterton, chairman; A. E. Gorham, W. D. Hood, E. J. McCall, C. E. Hagan, Attorneys Warner and Milton A. Holmes. The new company will manufacture internal gear drive trucks immediately. Although the new factory will probably not be finished for 90 days or more, construction of 1½- and 2-ton models will begin immediately at another factory, with an output which will probably reach four or five a day by Sept. 1.

Calendar

RACING

Aug. 10—Providence, R. I.
Aug. 17—Sheepshead Bay.
Sept. 2—Uniontown. Uniontown Speedway Assn.
Sept. 7 — Chicago. Chicago Speedway.
Sept. 21—Sheepshead Bay.
Oct. 5 — Cincinnati. Cincinnati Speedway.

ASSOCIATIONS

Aug. 5-9—Atlantic City, N. J. Motorcycle and Allied Trades Assn., United Cycle Trade, Cycle Jobbers of America, Cycle Parts and Accessories Manufacturers' Assn. and Bicycle Manufacturers' Assn. Hotel St. Charles.
Oct. 7-12—Milwaukee. American Foundrymen's Assn. and 5 allied organizations. Milwaukee Auditorium.

SHOWS

Sept. 2-7—Indianapolis, Indiana, State Fair. Indianapolis Automobile Trade Assn.
Sept. 9-14—Milwaukee. Milwaukee Automobile Dealers, Inc. Fourth Annual Wisconsin State Fair. Hart J. Ruddle, Mgr.
Sept. 14-21—Chicago, Automotive and Accessories War Exposition. Municipal Pier.
Oct. 14-27—Dallas, Tex. Seventh Annual Texas Automobile Show. Texas State Fair.
Oct. 16-18—Ottawa, Ont., International Plowing Match. Tractor and Farm Machinery Demonstration. Experimental Farm.

ENGINEERING

Sept. 2—Cripple Creek, Colo. American Institute of Mining Engineers.
Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street.